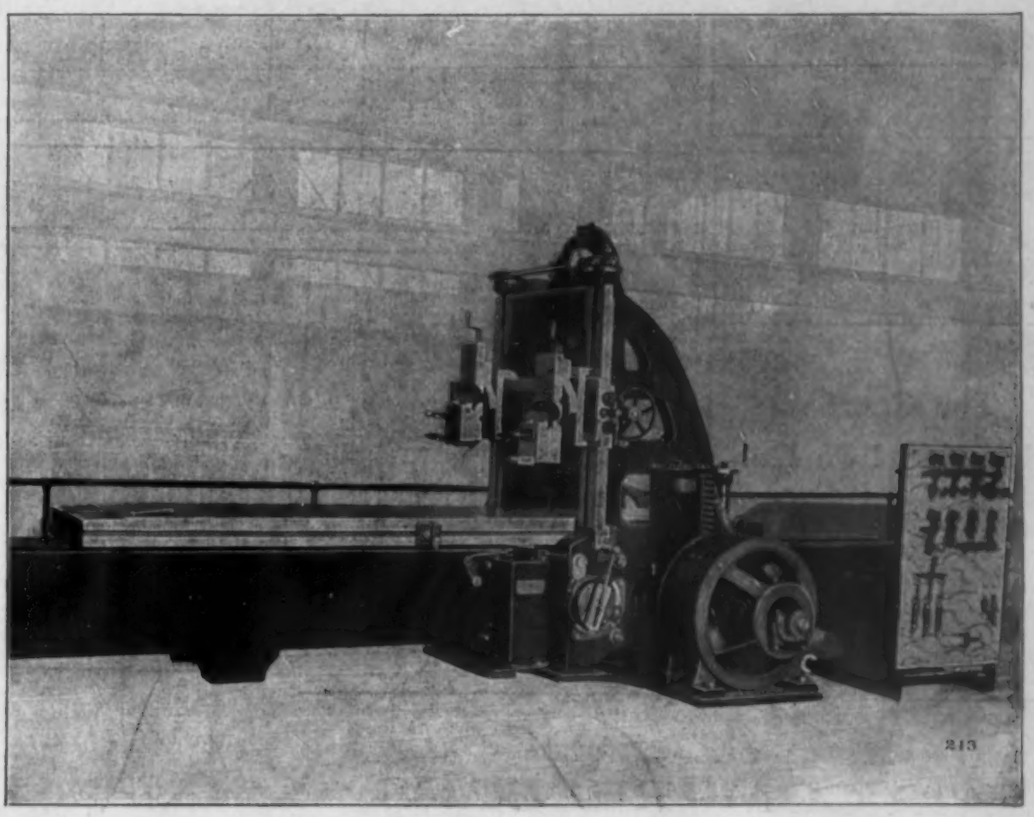
GENERAL LIBRARY,
UNIV. OF MICH.
JUL 14 1904

THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII CLEVELAND, OHIO, JULY 14, 1904 NUMBER 28

Improved Motor Drives for Planers



No driving belts nor clutches needed
Direct connection between motor and driving cross shaft of the planer
Cutting and return speeds may be instantly varied and accurately adjusted
No sparking nor undue mechanical straining at the instant of reversal
Armature of motor reversed at each end of stroke

Look for us in the Palace of Electricity at the World's Fair

SEND FOR BULLETINS

The Electric Controller & Supply Co.

MANUFACTURERS AND CONSULTING ELECTRICAL ENGINEERS

Main Office, CLEVELAND, OHIO

136 Liberty Street
NEW YORK

515 Frick Building
PITTSBURG, PA.

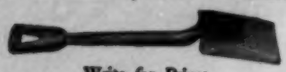
47 Victoria Street
LONDON, ENG.

High Grade
Jet Condenser, Hydraulic
High Duty, Low Duty
Vacuum and Direct Acting
Air Compressors

WILL-NOT THE SHORT-STROKE
"GREAT BURNHAM"
STEAM PUMP
Battle Creek, Mich. U. S. A.

We guarantee all types of pumps made by us to give perfect satisfaction.
UNION STEAM PUMP COMPANY

SHOVELS & SCOOPS
FOR COAL MINERS, IRON WORKERS, Etc.



Write for Prices
THE AVERY STAMPING CO. Cleveland, Ohio

THE ROBERT W. HUNT & CO.
Bureau of Inspection, Tests and Consultation
PITTSBURG: Monongahela Bank Bldg. CHICAGO: 1121 The Rookery. NEW YORK: 66 Broadway.
LONDON: 31 Norfolk House.
Reports on Iron and Steel Processes and Plants. Inspection of steel rails, splice bars, railroad cars, wheels, axles, etc. Chemical Laboratory—analysis of ores, iron, steel, oils, water, etc. Physical Laboratory—Test of metals, drop and pulling test of couplers, draw bars, etc. Efficiency tests of boilers, engines and locomotives.

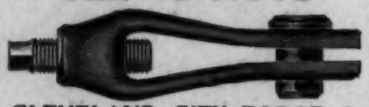
Steel and Malleable Castings

True to pattern. Quality unsurpassed. Steel will harden like tool steel.

Acme Steel & Malleable Iron Works
BUFFALO, N. Y.

TURNBUCKLES

CLEVIS NUTS



CLEVELAND CITY FORGE & IRON CO.
CLEVELAND, OHIO.

Fire Brick, Fire Clay, Pig Iron. *P. B. STEVENS, Detroit, Mich.*

O. TEXTOR, CHEMIST, ASSAYER AND METALLURGIST,
158 Superior Street, CLEVELAND, O.
Analysis made of ores, minerals, metals, fuel, water and foundry supplies. Ores sampled at mine, dock and furnac . Examinations made of mineral lands.

MEADVILLE MALLEABLE IRON CO.,
MEADVILLE, PA.
MALLEABLE CASTINGS of any description.
SATISFACTION GUARANTEED.

F. A. EMMERTON,
Chemist, Assayer and Metallurgist.
Ores sampled at lake ports, mines and furnaces. Mines and Metallurgical Processes Examined. Analyses made of Ores, Metals, Fuels, Railroad and Foundry Supplies, etc.
9 Bratenahl Building, CLEVELAND, O.

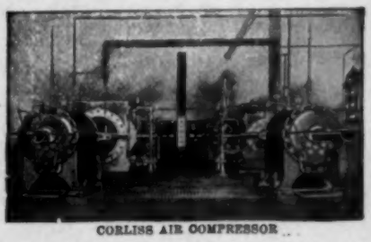
AIR COMPRESSORS CATALOGUE GRATIS
AMERICAN AIR COMPRESSOR WORKS
NO. 26 CORTLANDT ST., NEW YORK

The Canton Malleable Iron Co.
MALLEABLE CASTINGS OF ALL KINDS.
CANTON, OHIO.

OIL BURNING FURNACE NO. 11, herewith illustrated, has an opening 14 x 3½ inches.

OIL for FUEL
A successful system of burning oil for forging, annealing, hardening or heating iron, steel, etc.
25% SAVING OVER COAL OR COKE
Oil vaporized with a blast furnished from a fan, blower or steam pipe. Oil Burners, Forges and Crucible Furnaces. Write for Catalog.
Union Drop Forge Co.
68-70 E. Ohio St., CHICAGO, ILL.

It Pays to Buy
INGERSOLL-SERGEANT
AIR COMPRESSORS
and gain greater benefits of lower cost of operation and maintenance.
THE **INGERSOLL-SERGEANT** DRILL CO.
CHICAGO, ILL. CLEVELAND, O. BOSTON, MASS.
26 Cortlandt Street NEW YORK
PITTSBURG, PA. PHILADELPHIA, PA. ST. LOUIS, MO.
J 1



CORLISS AIR COMPRESSOR

NEW
MINIATURE
COMPRESSOR CATALOG
(Write Dept. 6)
RAND DRILL CO.
128 Broadway, N. Y.

THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, JULY 14, 1904 NUMBER 28

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

As has been the case several times in the past six months sentiment in the iron trade shows improvement where little or none is in evidence in actual market happenings. The cutting down of pig iron production and the possibility that this movement may be carried to a point where reduction of stocks, instead of accumulation, will quickly ensue, are factors whose possibilities are having attention. That the various pools have had their meetings and have reaffirmed prices, has constituted another favorable influence on sentiment, even though the general expectation was that no change would be made. Some influence may have been exerted also by the encouraging view the speculative community has been disposed to take of business prospects, a prominent factor no doubt being the well-published estimates of steel corporation earnings for the second quarter, these being on a basis thought to foreshadow the payment of the full dividend on the preferred stock for that quarter. It may be said also that the St. Louis convention turned out better for the business interests of the country than might have been expected.

But when account is taken of these various influences practically all the improvement side of the week's developments has been stated. The attitude of buyers of iron and steel has not changed, except that some pig iron inquiry may be attributed to the belief that concessions below the low point recently reached are not likely. The attitude of Southern sellers has been a trifle firmer perhaps and while $9 No. 2 iron has been sold there have been $9.25 sales also, and for fourth quarter delivery $9.50 is quoted. The coal miners' strike in Alabama is expected to extend through the month, but apart from the Tennessee Co.'s shut-downs there has been no curtailment except for repairs, and with the accumulated coke and shipments from West Virginia the fuel shortage will not be a problem for a time at least. There are considerable stocks on Southern furnace yards and shipments to consumers have shown some diminution lately. Northern furnaces make more effort than their Southern competitors to get business, and $11.75 at furnace has been cut. Sales of Southern basic iron at about $12.65 Chicago are reported and a low price on basic iron at Pittsburg has been made. In the Mahoning and Shenango Valleys no further curtailment of production is reported.

A number of good sized inquiries for pig iron are reported in the Central West, those from pipe works being the largest. The Cincinnati pipe contract for 14,200 tons was taken by the leading interest, which also has a 5,000-ton contract from Kansas City. Cincinnati is yet to specify on 18,000 tons of pipe for the work undertaken there. Chicago reports pig iron inquiries in lots ranging from 500 to 5,000 tons, and a trifle more firmness on the part of both Southern and Northern sellers. The East River tunnel castings —108,000 tons—are to be let today. It is reported that a Catasauqua, Pa., foundry will get a share of the order, the iron coming from well known Lehigh Valley furnaces. The pig iron for the North River castings which were awarded some time ago has not yet been bought.

Some inquiry appears in the finished material market, and a fair business has been closed in certain products. At Chicago there is 8,000 tons of bar iron under negotiation on railroad and car account, and wagon works are in the market. At Pittsburg further purchases of bar iron for car works are expected to the amount of 8,000 tons. A 5,500-ton contract for structural steel has been placed for the Carnegie Institute addition and bridge work in Pennsylvania took 5,000 tons. A steel intake at Erie, Pa., calls for 2,000 tons of plates, but in general plate business is no better. Contracts for 28 miles of iron pipe and 10 miles of steel pipe for Western Pennsylvania pipe lines indicate the sustained character of the demand in that direction.

Furnace coke sold at $1.35 at ovens tells the story of the change that has come over that industry in the year.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, July 12.

As anticipated, prevailing prices were reaffirmed at the various steel association meetings held in New York last week. Meetings of the billet, rail, plate, structural and bar associations were held, and after prices were reaffirmed by the billet manufacturers, similar action was taken all along the line. As a result of the billet meeting there will be less cutting in the trade than there has been in the past, several interests that led in making low prices having agreed to maintain quotations in the future. However, a number of independent manufacturers are still outside of the association and quotations from $1.50 to $2 below reaffirmed prices continue to be made. It was also decided to appoint a committee to investigate charges of cutting, several of the other associations already having such committees. It is thought doubtful now if lower prices on billets by association mills will prevail the remainder of the year. An improvement in the iron and steel trade is looked for in the fall which was thought sufficient to warrant a maintenance of prevailing quotations. The sentimental effect of the action taken last week has been good on the trade in general, although very little actual improvement in any lines can be noted.

Inquiries for pig iron for delivery during the next three months are numerous, although little business has yet resulted. Valley furnacemen refuse to meet the prices that are being offered by consumers, and the stand they have taken is already having a good effect. The quotations of the merchant furnaces in the two valleys are now down to cost and in a few cases iron has been sold at a loss, consumers thus being assured that there is little likelihood of lower prices. Coke and ore are also selling at prices that are regarded as low points in this movement, and unless railroad tariffs and labor are reduced there is no way of cutting down existing pig iron producing costs. While several merchant furnaces are selling No. 2 foundry at $12.35, Pittsburg, others will not shade $12.60, while a few, in order to protect existing contracts, refuse to quote below $12.80. On Bessemer iron few furnaces will contract below $11.75 Valley furnace, and for delivery throughout the remainder of the year $12 is asked. The range of prices on basic is wide, and while $11.40 to $11.50 at the furnace can be done, several operators refuse to sell below $11.75 to $11.90. On forge iron $12 to $12.10 Pittsburg can be done.

A large number of mills that were shut down last week

have resumed. All of the idle departments of the National Tube Co. at McKeesport, including the steel works and blast furnaces, are again operating in full, while several of the tin plate plants of the American Sheet & Tin Plate Co. have started. Up to the present time 22 concerns have signed continuous operation agreements with the Amalgamated Association, indicating that the mills desire to continue operation pending the settlement of the wage scales. Several independent sheet and tin plate mills are in this list, thus insuring to the association that there will not be a united break of these mills from that body as has been threatened. The conference with the American Sheet & Tin Plate Co. on the rebate question, which practically involves the entire sheet and tin plate scales, will be held in this city either next Monday or Tuesday. The indications now are that the association will permit the continuation of the collection of the rebate.

While the iron and steel bar trade continues quiet, considerable business is in sight for this month. The Pennsylvania Railroad Co. has not bought for two months, and the Pressed Steel Car Co. has only covered for about 4,000 tons of the 12,000 tons of iron required in the erection of the 4,000 steel cars recently contracted for. On sheets efforts to shade 2.10c for 28 guage are being resisted by the manufacturers, and several large contracts that were offered at 2.05c have been refused. With the present selling price of sheet bars, the independent manufacturers cannot make any lower quotations except at a loss, and consumers are beginning to realize that the low point in this line has also been reached.

The Carnegie Steel Co. this week was awarded the contract for furnishing the structural material required in the extension to the Carnegie Institute, amounting to 5,500 tons, while the public works department of the State of Pennsylvania this week awarded contracts for bridges to be erected in various parts of the State requiring about 5,000 tons of material. The largest bridges went to the Pennsylvania Steel Co. and to the King Bridge Co. of Cleveland. Two large contracts for line pipe were also awarded. One calls for 28 miles of iron pipe in sizes ranging up to six inches. It is understood that the contract price for this iron pipe was lower than the prices offered on steel pipe. Another order calls for ten miles of ten-inch pipe. Both are to be used in Western Pennsylvania lines.

Pig Iron.—While a half dozen merchant furnaces in the Valleys are preparing to go out of blast, the idle list referred to in these columns last week has not been increased. Stocks are being worked up at all of the plants and sufficient tonnage is being accumulated to tide the furnaces over their periods of idleness. The furnace operators are resisting all efforts to bring about further reductions, contending that at present prices they are merely trading dollar for dollar and do not wish to operate at a loss. Relatively the lowest price for iron now prevailing is on forge which nets the seller from $11.15 to $11.25 at furnace, and while $11.40 was done on Bessemer several days ago on a 4,000-ton lot, few furnaces will go below $11.75, while others are holding out for $12 in the Valley. With ore and coke at their low points, it is pretty generally conceded that the Valley furnaces cannot possibly sell iron any lower than present prices, and none of the operators will accept present quotations on contracts extending through the remainder of the year. The Southern market remains firm, No. 2 foundry being at $9 Birmingham as a minimum, and it is doubtful if $8 could be done on forge. Owing to the low prices that are being named by Northern producers, Southern iron cannot compete in this market at present. We revise quotations as follows:

Bessemer, Valley	$11 60 to 11 75
Bessemer, Pittsburg	12 45 to 12 60
No. 1 Foundry	12 75 to 13 00
No. 2 Foundry	12 35 to 12 60
Gray forge, Pittsburg	12 00 to 12 15
Chilled basic, Valley	11 40 to 11 50
Chilled basic, Pittsburg	12 25 to 12 35

Steel.—A number of interests heretofore outside of the billet association agreed at the meeting last week to maintain prices in the future, and a firmer market is expected. This does not mean, however, that concessions will not be made, as steel continues to be offered by other interests at from $1.50 to $2 below association prices. The following quotations were reaffirmed: Bessemer and open-hearth billets, 4 x 4 inches, and slabs up to and including 0.25 carbon, $23 Pittsburg, Wheeling, Valley, Johnston, Ashland, Ky., Ironton, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheets and tin bars are $1 per ton extra. Bessemer and open-hearth rods are quoted at $28 to $28.50 Pittsburg.

Ferro-Manganese.—The market continues quiet. Domestic ferro, 80 percent continues to be held at $41.50 to $42, delivered at buyers' mill, to any point east of the Mississippi.

Muck Bar.—There is practically nothing doing and the market is nominally $24 to $24.50 for prime bars.

Spelter.—Prime western grades are held at 4.75c to 4.80c, in carload lots, delivered, Pittsburg.

Skelp.—The demand is not heavy and the market is weak. Steel is held at 1.35c to 1.40c, and grooved iron at 1.45c and sheared at 1.50c.

Rails and Track Material.—Little new business is being placed by the railroads, while consumers of lighter sections are not buying. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 to 25 pounds, $22.50 to $23.50; 25 to 40 pounds, $20 to $21.50. Track material, Spikes, 1.60c to 1.65c.

Plates.—The James MacNeill Co. of this city was awarded a contract for a steel intake pipe at Erie, requiring upwards of 2,000 tons of plates. The market continues quiet and most of the plate mills are operating at only half their capacity. At the meeting of the plate association held last week prices were reaffirmed as follows: Tank plates, ¼ inch thick and up to 100 inches in width 1.60c at mill Pittsburg; flange and boiler steel, 1.70c marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates, more than 10 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

Structural Material.—At the meeting of the structural manufacturers held last week prices were reaffirmed. Several large contracts were awarded during the week, the Carnegie Steel Co. receiving the contract for furnishing the material for the Carnegie Institute extension calling for 5,500 tons, while contracts for bridges in different sections of this State were awarded by the public works department of Pennsylvania which will require 5,000 tons in all. The Penn Bridge Co. was awarded contracts for several of the bridges while the Pennsylvania Steel Co. and the King Bridge Co. of Cleveland took the two largest structures. Reaffirmed quotations follow: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Bars.—Quotations on steel bars were again reaffirmed at the meeting of the manufacturers held last week. On iron bars 1.30c, Pittsburg is being shaded in small lots. The Pressed Steel Car Co. is expected in the market shortly for about 8,000 tons of iron bars, while the Pennsylvania railroad has not done any buying for two months and is expected in the market shortly. Prices have been reaffirmed as follows: Bar iron, 1.25c to 1.30c Pittsburg for local delivery, while for Western shipments quotations are based on 1.25c to 1.35c Pittsburg. Hoops are held at 1.55c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open-hearth, 1.40c; plow beams and cultivator beams, 1.35c net; channels, angles,, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size, not less than 1,000 pounds, 10 cents advanced; less than 1,000 pounds of a size, 30 cents advance.

Sheets.—Producers are resisting efforts of large consumers to shade 2.10c on 28 gauge, and several offers of desirable tonnages have been turned down by several mills

which were offered at 2.05c. Few of the mills can operate at a profit on the 2.10c basis owing to the high price of sheet bars and all business at lower prices is now being pretty generally refused by the mills. This week the Youngstown Iron Sheet & Tube Co., resumed operations, and other independent sheet mills are signing the Amalgamated Association continuous scale. The independents are therefore not taking the stand against the Association expected, when they disagree with the scale committee. We make the following quotations: Black sheets, one pass, in carloads No. 8, 1.60c; No. 9, 1.65c; Nos. 12 to 14, 1.70c; Nos. 15-17, 1.75c to 1.80c; Nos. 18-21, 1.85c to 1.90c; Nos. 22-24, 1.95c; Nos. 25-26, 2c; No. 27, 2.05c; No. 28, 2.10c to 2.15c; No. 29, 2.35c to 2.40c; No. 30, 2.50c to 2.55c. Galvanized: Nos. 12-17, 2.20c to 2.25c; Nos. 18-21, 2.35c to 2.40c; Nos. 22-24, 2.50c to 2.55c; Nos. 25-26, 2.65c to 2.70c; No. 27, 2.90c; No. 28, 3.10c; No. 29, 3.45c to 3.50c; No. 30, 3.85c to 3.90c.

Wire and Wire Nails.—The market continues quiet, and mills pretty generally are shut down. Concessions of $2 per ton are reported from the West and South, but consumers in this immediate district cannot secure concessions of more than $1 a ton. We make the following quotations: Wire nails, carload lots to jobbers f. o. b. cars Pittsburg, are quoted $1.90 base; plain wire, carload lots, $1.80 base; barb wire, carload lots, $2.20 base; staples, carload lots, $2.05 keg. Galvanized 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.75, and less than carload lots, $1.80 f. o. b. Pittsburg, plus freight to point of destination. Terms, 60 days less 2 percent off in 10 days.

Merchant Steel.—The market continues quiet, and a revival of buying is not looked for before September. The shafting market is also quiet, the buying being limited owing to small amount of new construction. We make the following quotations: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.55c to 1.60c; plow steel, 6 inches and under, 1.35c for Bessemer and open-hearth; plow slabs, ¾ inch and heavier, 1.60c. The demand for shafting on the part of the machinery manufacturers is not heavy, and tonnage has therefore been considerably affected. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carload lots.

Pipes and Tubes.—A contract for 28 miles of iron pipe for a Western Pennsylvania pipe line went to the Susquehanna Iron & Steel Co. The pipe varies in sizes up to six inches. It is understood that the contract was taken at prices below that of the steel pipe offered. Another large contract placed calls for ten miles of ten-inch pipe for a pipe line in this part of the State. This week all of the idle departments of the National Tube Co. at McKeesport resumed operations after an idleness of about ten days. Practically no cutting has followed the last reduction as prices have reached a point where further concessions cannot be made except at a loss. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch	70	55	69	54
½ inch	78	63	72	62
¾ to 3 inches	78½	68½	77½	67½
3½ to 6 inches	77	67	76	66
7 to 12 inches	72½	57	71½	56
Extra strong plain ends, ⅛ to 8 inches	69	59	68	58
Double extra strong, ½ to 8 inches	60	50	56	46

MERCHANT BOILER TUBES, LESS CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1½ inch	48	43
1¾ to 2¼ inches	60	43
2½ inches	62	48
2¾ to 5 inches	68	55
6 to 13 inches	60	43

Old Material.—Heavy melting stock has been selling at $10.75 to $11, gross tons, Pittsburg, and consumers are picking up all the small lots that are being offered at these prices. Low phosphorus stock is selling at $13 to $13.50, gross tons, but there is little demand owing to the curtailed operations of the steel casting plants.

Coke.—Several contracts through the third quarter for furnace coke have been reported closed on a basis of $1.35, while for the fourth quarter $1.40 is being secured by producers. A number of operators are however holding out for $1.40 and $1.45, but it is doubtful whether these prices can be secured until the lower priced coke is cleaned up. On foundry coke there are offerings as low as $1.65 and $1.75, but several of the leading producers will not sell below $1.85 to $1.90. Coke production continues to be curtailed, the output of the upper region during the week ending Saturday, July 2, amounting to only 162,912 tons and that of the lower region 48,976 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, July 12.

Midsummer dullness prevails in local iron and steel circles, and with the exception of a good demand for pig iron and bar iron, trading in metal products in the past week has been at low ebb. The combination of vacation influences, summer shut-downs and labor troubles, which are all acutely felt at this time, has created a feeling of procrastination on the part of buyers that is hard to overcome. Despite this, however, there is no room for pessimism in the local outlook; nor, on the other hand, is there any room for great expectations. Prices on some products are still a little uncertain, but the market as a whole is on a firm foundation. The generally satisfactory reports as to crops foreshadow an improvement in the iron and steel markets; and there are some indications that the large consuming interests are slowly emerging from the narrow confines of the economic policy they have followed so long. Three railroad interests are in the market for a total of 8,000 tons of bar iron, the bulk of which will be placed this week; and there has been some inquiry from other carrying sources for rails, track supplies and other material. The reaffirmation of prices on billets, plates and structural shapes by the various associations which met last week has had a steadying influence on the market though without materially improving the demand. Some mills continue to shade prices on billets, bars and plates, but are booking little tonnage. There is a good inquiry coming from wagon and carriage builders for bar iron wants in the last half, and several have covered for their requirements for this period in the past week. Sheets are quiet and prices are being cut $1 to $2 a ton. The reductions in merchant pipe and boiler tubes have not stimulated demand for these products to any extent and the market is dull. Some good sized contracts have been let recently for cast iron pipe, including 15,000 tons for Cincinnati, 5,000 tons for Kansas City, and several smaller lots for other municipalities. There is also a good round tonnage still pending. Wire products are languishing, though it is a seasonable dullness. Foundry coke is in fair demand, standard grades of both Connellsville and Southern cokes being held at $2 at the ovens. Old material is firmer, the increased strength resulting from the speculation of several large dealers who are buying up all the favorable lots that are offered.

Pig Iron.—The past week was a busy one for sellers of pig iron. New life was suddenly infused into the local market, and a buying movement of no small proportions has set in. Inquiries for lots from 500 to 5,000 tons are numerous, many melters asking for deliveries extending to Dec. 31, and, in some instances, beyond this date. Foundrymen appear to be generally convinced that prices have touched rock bottom, and are now anxious to get under cover before any advances are made. Pig iron is undoubtedly firmer than it was a week ago, and $9 No. 2 iron is not so easy to obtain as on the date of our last report. A few furnaces are still making this price, but they are rapidly selling out their capacity. Southern producers are generally asking $9.25 Birmingham for No. 2, though some interests set their product at 25 cents a ton higher. The suspension of operations at several of the Tennessee company's furnaces following the coal miners' strike has not yet had any effect on the local situation, beyond stimulating demand, though sellers expect prices will advance if the curtailment is of long duration. Many furnaces

have large stocks on hand, and until these are disposed of, quotations will not be materially changed. Transactions in the past week have included all grades of foundry irons, as well as basic and malleable. The report that a local consumer bought 10,000 tons of basic around $9 Birmingham is generally credited in this market, though reliable information as to the details of the transaction cannot be obtained. Malleable iron is firm at $13.50, Chicago. Northern irons are without material change. There is a fair demand and prices are firm at $13.50 Chicago for No. 2. Our quotations follow:

Lake Superior Charcoal	$14 50 to 15 00
Northern Coke Foundry No. 1	14 00 to 14 25
Northern Coke Foundry No. 2	13 50 to 13 75
Northern Coke Foundry No. 3	13 00 to 13 25
Northern Scotch Foundry	14 25 to 14 50
Ohio Strong Softeners No. 1	14 80 to 15 30
Ohio Strong Softeners No. 2	14 30 to 14 80
Southern Coke Foundry No. 1	13 15 to 13 40
Southern Coke Foundry No. 2	12 65 to 12 90
Southern Coke Foundry No. 3	12 40 to 12 65
Southern Coke Foundry No. 4	12 15 to 12 40
Southern No. 1 Soft	13 15 to 13 40
Southern No. 2 Soft	12 65 to 12 90
Southern Gray Forge	11 90 to 12 15
Southern Mottled	11 90 to 12 15
Southern Silveries (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	13 50 to 14.00
Alabama Basic	13 15 to 13 40
Virginia Basic	14 40 to 14 65

Billets.—A forging company at Indiana Harbor, Ind., is reported to have bought this week 1,500 tons of open-hearth axle billets, 6 x 6. It is not definitely known what price the order was taken at, although the bid of $22.40 f. o. b. Chicago, made by a local dealer, acting for an independent Eastern producer, did not land the business. It is stated that a local mill got the order, and as there are only two in this city capable of handling such a tonnage of open-hearth billets, both members of the Association, it is evident that parties to the billet agreement are not maintaining the agreed schedule, despite its reaffirmation at the meeting of the association in New York City last week. We quote association prices for Bessemer and open-hearth billets, 4 x 4 and larger, up to .25 carbon, $24; up to and including .60 carbon, $1 extra over .60 carbon, $2 extra. Billets, 3⅞ inches and smaller, and sheet and tin bars, $25. Open-hearth billets from store, $1.30 per 100 lbs.

Iron and Steel Bars.—The bar iron market is firm and prices have an advancing tendency. It is possible to place an order at 1.30c on large and desirable contracts, though on smaller lots 50 cents and $1 a ton higher is asked. There has been a good demand for iron during the past week. Haskell & Barker are said to have placed their order for 3,000 tons, the price said to be not less than 1.30c. The Illinois Central has come into the market for 2,000 to 3,000 tons, and Armour & Co. are said to be receiving bids on 1,000 tons. In addition to these, a Pittsburg broker is asking bids on 3,000 tons of 1½ inch rounds; and there are also a large number of inquiries for smaller lots, from wagon and carriage makers, who are asking bids on their requirements for the last half. Steel bars are in a quiescent state so far as new business is concerned. Specifications, however, are ample, and show no decrease. We quote as follows: Bar iron, 1.30c to 1.35c, base half extras; soft steel bars, 1.40c to 1.51½c, half extras; soft steel angles, less than 3 x 3, 1.61½c; hoops, 1.71½c. On lots from store, we quote: Iron bars, 1.75c base, full extras; steel bars, 1.70c to 1.80c base, half extras; hoops, 2c to 2.10c rates, full extras.

Sheets.—The summer shut-down of many mills has resulted in a great curtailment of demand. A little contracting has been done during the week for future deliveries, though generally speaking mills are averse to taking on new obligations until after the settlement of the wage scale. Prices are weak and are being shaded from $1 to $2 a ton. We quote as follows: For one pass, cold rolled, blue annealed sheets, mill shipments, Chicago delivery: Nos. 8 and 10, 1.77½c to 1.79½c; Nos. 11 and 12, 1.79½c to 1.86½c; Nos. 13 and 14, 1.84½c to 1.91½c; Nos. 15 and 16, 1.89½c to 2.01½c. On box annealed, one pass, cold rolled: Nos. 18 20, 2.06½c to 2.11½c; Nos. 22-24, 2.11½c to 2.16½c; Nos. 25-26, 2.16½c to 2.21½c; No. 27, 2.21½c to 2.26½c; No. 28, 2.31½c to 2.36½c; No. 29, 2.46½c to 2.51½c; No. 30, 2.56½c to 2.61½c. Store trade is brisk and a good volume of business has been booked by local jobbers within the week past. Prices have been reduced $2 a ton, and we now quote as follows: No. 10 and heavier, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; No. 18, 2.30c to 2.40c; No. 20, 2.30c to 2.40c; No. 22, 2.35c to 2.45c; No. 24, 2.40c to 2.50c; No. 26, 2.50c to 2.60c; No. 27, 2.60c to 2.70c; No. 28, 2.70c to 2.80c; No. 29, 2.85c to 2.95c. Galvanized sheets are quiet, and we quote Pittsburg discounts, f. o. b. mill, 80 and 5 to 80 and 10. For shipments from local store, 75, 10 and 5 to 80 percent.

Structural Steel.—The only contract of importance let during the week under review was one for the erection of a large warehouse and factory building, calling for 800 tons of structural shapes. In other respects, the market is without news or interest. Prices are unchanged, and we quote carlots, mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles, 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 2c; beams, 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—Leading producers report there is a fair demand for universal plates, though the orders are usually for small lots. Some of the independent mills making narrow widths are offering plates ¼-in. and heavier, 60-in. wide and narrower, $2 a ton below association prices. We quote carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86½c; marine, 1.96½c; universal mill plate, 1.76½c to 1.81½c; 3-16-inch, 1.86½c; Nos. 7 and 8, 1.91½c; No. 9, 2.01½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel, ¼-inch, and heavier, 2c; 3-16, 2.10c; No. 8, 2.15c; No. 10, 2.15c; flange steel, 2.25c, all f. o. b. warehouse.

Rails and Track Supplies.—Some small contracts for standard rails, aggregating several thousand tons have been placed in this market during the past week. There has also been a good demand for light rails, and some movement in track supplies. We quote heavy sections, mill shipments, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails $27; light rails, $23 to $25; track supplies, f. o. b. Joliet mill; angle bars, 1.35c to 1.45c; spikes, first quality, 1.65c to 1.75c; track bolts, ½ x ¾, with square nuts, 2.20 to 2.30c per 100 lb.; with hexagon nuts, 2.35c to 2.45c.

Merchant Pipe.—No material improvement is to be observed in the demand for merchant pipe following the reductions in prices announced last week. The usual daily routine of orders and specifications continue to be received and these keep of fair proportions. We quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛ to ⅜ inch	68.35	53.35	67.35	52.35
½ inch	71.35	61.35	70.35	60.35
¾ to 3 inches	76.85	66.85	75.85	65.85
3½ to 6 inches	75.35	65.35	74.35	64.35
7 to 12 inches	70.85	55.35	69.85	54.35

Boiler Tubes.—The demand of the past week shows some increase over previous weeks, but it is yet far from being satisfactory. We quote carload lots, mill shipments, Chicago delivery, as follows:

BOILER TUBES.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	46.35	41.35	52.35
1¼ to 2¼ inch	58.35	41.35	40.35
2½ inch	60.35	46.35	43.35
2¾ inch to 5 inch	66.35	53.35	⎧ Up to 4 inches.
..... 58.35	41.35	⎩ 50.85	6 to 13 inch .....

Merchant Steel.—There has been some new business from implement and wagon manufacturers during the past week, but not of proportions to warrant special comment. A cut of $2 a ton has been made in carriage spring steel, which is the only change in prices. We quote carload lots, mill shipments, Chicago delivery, as follows: Spring

steel, 1.90c; sleigh shoe, flat sizes, 1.56½c; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.30c and upward, according to quality; toe calk, 2.06½ base. Ordinary grades of crucible tool steel, 6½c to 8c; special tool steel, 12c up. Cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

Cast Iron Pipe.—Contracts have been closed recently with the city authorities of Cincinnati for 15,000 tons and with Kansas City, for 5,000 tons, and for smaller lots with other municipalities. There is a good tonnage pending, and a nice business is expected to be closed up in the next few weeks. Prices are unchanged, and we quote 4-inch water pipe, $26; to 12-inch, $25; larger sizes, $24.50; gas pipe, $1 a ton higher.

Wire Products.—Reports are current that independent producers are shading the prices of the leading interest on nails and wire to stimulate the demand. The market continues quiet, however, specifications and orders being of only fair volume. No change has been made in prices by the leading producer, and we quote to jobbers, carload lots, Chicago delivery, as follows: Wire nails, carload lots, $2.10; less than carload lots, $2.15; cut nails, carload lots, 1.91½c base; less than carload lots, 1.96½c; smooth wire, carloads, $2, and $2.05 for less than carload lots; galvanized smooth wire, $2.30 in carloads and $2.35 in lesser amounts; painted barb wire, $2.40 carloads, and $2.45 in less than carload lots; galvanized barb wire, $2.70 carloads, and $2.75 less than carload lots. Staples, polished, carloads, $2.25; less than carload lots, $2.30; galvanized, $2.55 carloads and $2.60 less than carload lots. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—The local market is much stronger than it has been for several weeks and a fair demand is felt for both Connellsville and Southern brands. Prices of good 72-hour foundry coke, whether Connellsville or Southern, are firm at $4.65 Chicago, or $2 at the ovens, though poorer grades are being offered at slightly lower prices.

Old Material.—There is a much firmer tone to the local market, though it has not grown out of any increase to the demand from the consuming interests. Prices are if anything 25 cents to 50 cents a ton higher. The improvement is largely the result of the speculation that is being done by several large local dealers who are buying up all the materal they can get at the present low prices. Old steel rails for rerolling and old wheels have advanced 50 cents a ton, and several other items are fractionally higher. We have revised these quotations, and quote selling prices, gross tons, as follows:

Old iron rails	$14 50 to 15 00
Old steel rails (4 feet and over)	11 00 to 11 50
Old steel rails (less than 4 feet)	10 00 to 10 50
Relaying rails, subject to inspection	22 50 to 23 00
Relaying rails for sidetracks	18 00 to 20 00
Old wheels	11 50 to 12 00
Heavy melting steel	9 50 to 10 00
Mixed country steel	7 00 to 7 50

The following quotations are for net tons:

Low phosphorus scrap (.04 and under)	12 00 to 13 00
No. 1 R. R. wrought	10 50 to 11 00
No. 2 R. R. wrought	9 50 to 10 00
Shafting	12 50 to 13 00
Dealers' Forge, No. 1	8 00 to 8 50
Wrought pipe and flues	7 50 to 8 00
No. 1 cast, 150 lb. and less	9 25 to 10 00
Heavy cast	7 75 to 8 25
No. 1 mill	6 00 to 6 50
Country sheet	5 00 to 5 50
No. 1 boilers, cut	7 50 to 8 00
Boiler punchings	9 00 to 9 50
Iron car axles	15 00 to 15 50
Steel car axles	13 50 to 14 00
Iron axle turnings	7 00 to 7 50
Steel axle turnings	7 00 to 7 50
Cast borings	3 00 to 3 50
Mixed borings, etc.	3 00 to 3 50
Wrought turnings	6 00 to 6 50
Machine shop turnings	6 00 to 6 50
Railroad malleable	8 25 to 8 75
Agricultural malleable	7 75 to 8 00
Stove plate and light cast scrap	7 25 to 7 75
Old iron splice bars	12 00 to 12 50

Templeton, Kenly & Co., 543 The Rookery, Chicago, will move their office to the works, 33-37 E. Ontario street.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, July 13.

Iron Ore.—Very few sales are being made, especially of Bessemer grades, on which the usual quotation is $3.25 for old range and $3 for Mesabi. More orders for non-Bessemer have been placed and buyers have been able to get concessions on recent quotations of from 10 to 25 cents, so that old range non-Bessemers have sold at from $2.50 to $2.60 and Mesabis at $2.25 to $2.50.

Freight rates on ore from Duluth and Marquette remain at 70 and 65 cents respectively, but within a few days the Escanaba rate has been cut from 55 to 50 cents. The smaller vessels find very little, if any, profit under present conditions and some of them will be taken out of commission unless conditions improve.

Pig Iron.—Inquiries for delivery in the next three months have been coming in much more freely and the tone of the market seems to be stronger. There is now very little Southern iron obtainable at $9 Birmingham for No. 2 and it seems probable that an advance of 25 cents will be asked if pending inquiries develop as expected. In spite of efforts of foundries to place orders at $11.50 to $11.75 for No. 2 Northern at the furnaces, a fair amount of business has been done at $12 and while that price could doubtless be shaded 25 cents for a desirable order, reports of sales at $11.50 are not confirmed and offers at that price have been refused by several sellers. Basic is weak, selling at $11.40 to $11.50 in the Valley, but some producers are piling their iron or going out of blast in preference to selling at such low prices. The Struthers Furnace Co. blew out its stack at Struthers today for an indifinite period. Its principal product is basic ron. We quote as follows for Cleveland delivery:

Bessemer	$12 60 to 12 75
No. 1 Strong Foundry	12 75 to 13 00
No. 2 Strong Foundry	12 60 to 12 85
No. 3 Foundry	12 25 to 12 50
No. 2 Southern	12 85 to 13 10
Gray Forge	12 15 to 12 25
Gray Forge, Southern	11 85 to 12 00
Lake Superior charcoal	14 25 to 14 50

Finished Material.—The reaffirmation of prices on shapes, plates and billets has had little, if any, effect on the market, which is still very quiet. Structural material shows some improvement. The bar iron mills are closed and the little business being done is by jobbers. The quotation of 1.35c Pittsburg, or 1.44½c Cleveland, for bar iron is to a large extent nominal. Steel bars at 1.44½c Cleveland for Bessemer and 1.49½c for open-hearth are very dull. On sheets, low prices are being made in competition, but in small lots. Quotations are about as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10 1.74½c; No. 11-12, 1.79½c; No. 14, 1.84½c; No. 16, 1.94½c; No. 27, 2.19½c; No. 28, 2.29½c. Galvanized, mill sales, No. 14, 2.29½c; No. 16, 2.39½c; No. 18-20, 2.54½c; No 22-24, 2.69½c; No. 25-26, 2.89½c; No. 27, 3.09½c; No. 28 3.29½c. Black sheets out of stock: ¼ in., 1.90c; 3-16 in., 2c. Blue annealed: No. 10, 2.05c; No. 12, 2.10c; No. 14 2.15c; No. 16, 2.25c. One pass cold rolled: Nos. 18-20, 2.35c; Nos. 22-24, 2.40c; No. 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 30, 3c. Galvanized out of stock: No. 16, 2.60c; No. 18-20, 2.70c; No. 22-24, 2.85c; No. 26, 3.05c; No. 27 3.25c; No. 28, 3.45c; No. 30, 4.25c.

Old Material.—There has been some demand for railroad wrought, but with this exception the extreme dullness continues. Cast borings and stove plate have declined 25 to 50 cents. We quote as follows:

Old iron rails	$14 00 to 15 00
Old steel rails (over 6 feet)	12 00 to 12 00
Old steel rails (under 6 feet)	11 00 to 12 00
Old car wheels	10 00 to 11 00
Steel boiler plate	9 00 to 10 00
Malleable iron (railroad)	9 00 to 10 00
Malleable iron (agricultural)	8 00 to 9 00
Heavy steel	9 00 to 10 00

We quote the following net tons:

No. 1 R. R. wrought	$10 00 to 11 00
No. 1 busheling	8 50 to 9 00
No. 1 machine cast	9 50 to 10 50
Iron axles	15 00 to 16 00
Axle turnings	7 00 to 8 00
Wrought turnings (free from cast)	6 00 to 6 50
Grate bars	7 00 to 8 00
Pipes and flues	8 00 to 8 50
Tank iron	7 50 to 8 50
Hoop and band iron	5 00 to 5 50
Sheet iron	4 00 to 5 00

Wrought drillings	6 00 to 6 50
Stove plate	7 00 to 7 25
Steel axles	13 00 to 14 00
Cast borings	3 50 to 4 00

CINCINNATI.

July 12.

The coke market is quiet and unchanged with an easy tone prevailing. Foundry coke is quoted at $1.85 f. o. b. Connellsville. Furnace coke is selling at low and irregular prices.

Pir Iron.—The situation furnishes little in the way of news for comment. Buying continues of small lot orders to cover current needs. There is some increase in inquiries of this character, which is but natural as there has been practically no iron bought to cover third quarter requirements, and consumers' stocks are reported as light. There have been also inquiries from leading cast iron pipe interests, and a few lots involving several thousand tons each are pending. A manufacturer in Chicago is reported to have bought during the week 2,500 tons of Southern iron. It is also reported that the leading cast iron pipe interest took 2,000 tons of Northern iron from the Ironton district. There is also an inquiry for 500 tons from a local consumer. Buyers and sellers alike appear to be apathetic as to the future of prices. The Southern furnace interests are not urging their product upon the market, and while Southern iron can be had on the basis of $9 Birmingham for No. 2 foundry, many of the Southern furnaces are holding for $9.25 and $9.50. Advices from Birmingham now indicate that there will be no early suspension of operations as low rates have been made on coke from Virginia ovens, which, with a plentiful supply of this fuel available at prices about as low as cost of making the coke at Birmingham, furnishes an inducement for the furnaces to buy their fuel and continue in blast. Convict labor is also a factor in augmenting the coke supply, so that aside from the action of the Tennessee company, there is not likely to be any important curtailment of production in this direction. But little is heard in the trade in regard to Northern irons, aside from the fact that $12 at furnace for No. 2 foundry can be shaded. We quote in carload lots f. o. b. Cincinnati:

Southern Foundry No. 1	$12 25 to 12 50
Southern Foundry No. 2	11 75 to 12 00
Southern Foundry No. 3	11 25 to 11 50
Southern Foundry No. 4	11 00 to 11 25
Southern Foundry No. 1 soft	12 25 to 12 50
Southern Foundry No. 2 soft	11 75 to 12 00
Gray Forge	10 50 to 10 75
Northern Foundry No. 1	13 65 to 13 90
Northern Foundry No. 2	13 15 to 13 40
Southern car wheel iron	16 25 to 16 50

Finished Material.—No change in the situation appears to have developed during the week. The demand continues close to current needs, and the volume of business is moderate. Bar iron is quoted at 1.35c, but it is intimated that this quotation could be shaded on any large order. Steel bars, 1.48c, half extras, with dealers quoting 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.30c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.35c; No. 14 2.25c; No. 12, 2.16c; No. 10, 2.05c. Tank plates are dull and sell out of store at 2c for ¼-inch and 2.10c for 3-16-inch. Beams and channels are quoted at 2c from stock and angles at 1.90c to 2c for base sizes.

In merchant pipe the market continues quiet with only a moderate demand. We omit quotations for boiler tubes as dealers are quoting only upon inquiry and specifications. We quote in car lots f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	68.7	53.7	67.7	52.7
½ inch	71.7	61.7	70.7	60.7
¾ to 3 inch, inclusive	77.2	67.2	76.2	66.2
3½ to 6 inch, inclusive	75.7	65.7	74.7	64.7
7 to 12 inch, inclusive	71.2	55.7	70.2	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
to 13 inch	54.2	36.7

Old Material.—It is still a "dealers' market" with consumers buying practically nothing. Quotations are largely nominal in the absence of business. We quote:

Old No. 1 railroad wrought, net tons	$10 00 to 10 50
Cast machine and foundry, net tons	9 50 to 10 00
Old iron rails, gross tons	12 50 to 13 00
Old steel rails, gross tons	9 50 to 10 00
Old short lengths, gross tons	10 00 to 10 50
Old iron axles, net tons	13 50 to 14 00
Stove plate, net tons	6 00 to 6 50
Wrought turnings, net tons	6 00 to 6 50
Cast borings, net tons	3 00 to 3 50

NEW YORK.

Pig Iron.—The local market during the past week has been a little more active. One sales agent, whose total sales during June amounted to 5,500 tons, reports sales during the past week of about 10,000 tons, the majority of it Southern iron. Other sales agents had a slight increase in orders also, but not by any means to the extent of the one mentioned. In Northern irons the willingness to take business at the expense of prices has been pretty strong, and the increased activity in the market can be attributed to this in a measure. At the same time many consumers found it necessary to replenish their stocks, and managed to do it on very favorable terms. Southern makers have not shown much eagerness to get orders at present prices, but one large interest, whose prices are invariably higher than those of its competitors, has booked some little No. 2 foundry at $9.25 Birmingham, for delivery in the third quarter. This company has not as yet made any schedule for the last quarter, but other Southern companies will take orders now at $9.50 to $9.75 for that delivery. There are several good inquiries in the market, the most notable of which is one for 3,200 tons from the General Electric Co., 2,000 tons for foundry grades, and 1,200 tons basic.

The contractors for the 108,000 tons of castings that will be required for the East river section of the Pennsylvania tunnels have practically awarded the orders. E. W. Moir, who has the matter in charge, and who sails for Europe tomorrow, admitted as much today, but said that there are a few details that have yet to be attended to before any details can be given out. Gossip here is that several interests will get parts of the order at about $27 per ton. New York pig iron quotations at tidewater follow: Northern No. 1 X foundry, $14.75 to $15; No. 2 X, $14.25 to $14.50; No. 2 plain, $13.75 to $14; Southern No. 1 foundry, $13.25 to $13.50; No. 2 foundry, $12.50 to $13; No. 3 foundry, $12 to $12.50; No. 4 foundry, $11.50 to $12.

Rails.—As large orders are reported, but business in from 100 to 500-ton lots both for standard sections and light rails is fairly good. Standard sections continue $28 at mill.

Billets.—The billet pool met during the week and decided to hold to present prices, but the latter are being shaded, especially for a desirable order.

Finished Iron and Steel.—Following the announcement of prices having been reaffirmed at meetings held during the week, structural material and plates became a little more active. This was especially true in plates, some buyers having withheld their orders in anticipation of a reduction in prices. The decision to maintain the latter came after a discussion that lasted nearly three hours. In structural shapes there is considerable business hanging fire, particularly from railroad sources, but definite information as to when it will be placed is not obtainable. Sheets are still being sold at concessions when a good order is possible. Bars are only fairly active, with prices still showing signs of weakness. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.35c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84¼c to 1.90c; firebox, ordinary, 1.94½c to 2c; refined iron and soft steel bars, 1.49½c; sheets, in carload lots, New York, No. 28, black, 2.35c to 2.40c; galvanized, 3.40c to 3.45c.

Old Material.—The situation is a featureless one, buyers and sellers being unwilling to do business now, in anticipation of higher prices next month. As a result those who want to dispose of holdings now must take poor prices. There is good inquiry for old rails, especially by speculators. Heavy steel scrap in shape for charging is in demand at $10.50 to $11, but no sales have resulted. There is a better feeling in heavy

cast iron wheels, and higher prices all around prevail. In other kinds of old material an unsatisfactory market exists. Holders ask the following prices per gross ton:

Old iron rails	$14 00 to 14 50
Old steel rails, long lengths	11 75 to 12 50
Old steel rails, short pieces	10 00 to 10 50
Relaying rails	16 00 to 17 00
Old car wheels	11 50 to 12 50
Old iron car axles	15 50 to 16 00
Old steel car axles	14 00 to 14 50
Heavy melting steel scrap	10 50 to 11 00
No. 1 railroad wrought scrap	11 50 to 12 00
Iron track scrap	10 50 to 11 00
Wrought pipe	7 75 to 8 25
Ordinary light iron	4 50 to 5 25
Cast borings	3 50 to 4 00
Wrought turnings	5 50 to 6 00
No. 1 machinery cast	9 00 to 10 00
Stove plate	7 50 to 8 25

PHILADELPHIA.

July 12.

Although the production of pig iron has been curtailed, it is evident that the output has not yet been sufficiently reduced and it is expected that more furnaces will be blown out at an early date. The recent meetings of manufacturers of billets, plates and shapes have attracted little attention. Finished material in England and Germany has declined in prices so that it can be imported. Ocean freights are very low and the import movement is being closely watched.

Pig Iron.—Orders are few and for very small amounts. Inquiries have been rather numerous, but seldom result in sales. Prices are nominally the same, but the market shows signs of weakness and concessions would doubtless be made to get orders of fair size. We quote: No. 1 X foundry, $15.25 to $15.50; No. 2 X foundry, $14.50 to $14.75; No. 2 plain, $13.75 to $14.25; Alabama No. 2 rail shipment, $13.50 to $13.75; Alabama No. 2 on dock, $12.75 to $13.25; standard gray forge, $13.25 to $13.50; ordinary gray forge, $12.75 to $13; basic, $13.10 to $13.25.

Finished Material.—Many mills have been closed for repairs and business is lifeless. The outlook is not encouraging. We quote: Beams, channels and angles, 1.73½c to 1.85c, according to the specifications, and small angles, 1.50c to 1.55c. Bars, both iron and steel, 1.48½c to 1.55c; skelp, 1.45c to 1.50c, sellers' mill for grooved and a tenth more for sheared.

Old Material.—There is very little demand and prices are unchanged, as follows:

No. 1 steel scrap, $11 to $11.50; low phosphorus scrap, $15 to $16; old steel axles, $15 to $16; old iron axles $16 to $17; old iron rails, $14.50 to $15; old car wheels, $11 to $11.50; choice R. R. No. 1 wrought, $12.50 to $13; machinery cast, $11 to $12; No. 2 light scrap (forge), $9.50 to $10; No. 2 light scrap (ordinary), $8 to $8.50; axles turnings, $9 to $9.50; wrought turnings, $8 to $8.50; cast borings, $6 to $6.50; stove plate, $8.75 to $9.25; wrought iron pipe, $9.50 to $10.

BIRMINGHAM, ALA.

BIRMINGHAM, Ala., July 11.—The Southern pig iron market shows but little change, beyond the fact that the quotations have stiffened up some. No. 2 foundry is now being held at $9.25 to $9.50 per ton, with the latter price being asked for. Production has not been further curtailed since the Tennessee Coal, Iron & Railroad Co. banked all its furnaces except those at Ensley. The miners and mine workers in the employ of the furnace companies in Alabama, with the exception of the Woodward Iron Co., are still out. This does not disturb the furnacemen much, as all laid in good supply of coal and coke, while non-union mines and West Virginia concerns will come to their rescue. The Sloss-Sheffield Steel & Iron Co. expects soon to blow one of its city furnaces for repairs.

There is a little better inquiry for iron in this section, with the demand still holding up to about the production. A large interest was in the market during the past week and bought a round lot of iron. Shipments of iron are not as brisk as they might be.

Furnacemen anticipate an early improvement in conditions all around. The curtailment of production in the North and apprehension of a forced curtailment in this section will, it is believed, bring about a better demand and better prices. The following quotations are given by local sellers: No. 1 foundry, $9.50 to $10; No. 2 foundry, $9.25 to $9.50; No. 3 foundry, $8.75 to $9; No. 4 foundry, $8.50 to $8.75; gray forge, $8 to $8.50; No. 1 soft, $9.50 to $10; No. 2 soft, $9.25 to $9.50.

It is stated that one or two of the smaller furnace companies has bought coke in West Virginia to be delivered in Alabama 15 cents a ton cheaper than it is to be purchased at home delivered. There is a strong belief that the differences on wage contract between the operators and United Mine Workers of America will be settled by the end of this month.

The Woodward Iron Co. will bank two furnaces for a short time for necessary repairs. This company has signed a temporary contract with the mine workers pending a permanent settlement and there is no interruption of work at its coal mines. This company is pushing the work on its new third furnace at Woodward and in the next few months expects to be able to operate it. The Tennessee Coal, Iron & Railroad Co. and the Sloss-Sheffield Steel & Iron Co. have mines operated with convict labor and the last named company has four or five mines in operation with non-union labor, so that their needs for coal and coke are going to be supplied.

There has been no work in any rolling mill in this district since July 1. It is given out that the Tennessee Coal, Iron & Railroad Co. will make an effort to start up the bar mill department of its Bessemer plant, and there are indications that it will be an open mill.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., July 12.

Pig Tin.—The week has witnessed only a slight increase in prices, but the market had a stronger undertone. The trade situation is reported to be slightly improved, and some large consuming interests have purchased pretty freely recently. In London the market has been fairly active, with prices for both spot and futures over £1 higher than when we last quoted them. Closing prices today follow: Spot, 25.90 to 26.20c; July 25.85 to 26.15c; August 25.75 to 26.15c. London's closings today follow: Spot, £118 10s; futures, £118 15s. Arrivals at Atlantic ports for the month aggregate 1,315 tons, with 2,319 tons afloat.

Copper.—While prices remain unchanged, consumers do not take kindly to them, and are disposed to withhold good orders until concessions are made. The situation in trade circles is fairly good, with buying for export continuing to show up well. In London the market has been dull, but prices have been a shade firmer. Today's closings follow: Lake, 12⅝ to 12⅞c; electrolytic, 12½ to 12¾c; casting, 12¼ to 12½c. London's closings today follow: Spot, £57 3s 9d; futures, £57 1s 3d. Exports for the month to date amount to 4,316 tons.

Lead.—Is unchanged here at 4.25 to 4.35c. St. Louis is considerably stronger at 4.15 to 4.20c. London is a trifle higher at £11 12s 6d.

Spelter.—Is quiet and unchanged at 4.85 to 4.95c. St. Louis is weaker at 4.75c. London remains at £22.

Antimony.—Cookson's is 7.25c asked. Hallett's is 7.00c to 7.25c. Other brands are quoted at 6.00 to 6.25c.

Quicksilver.—We quote $43.50 per flask of 76½ pounds in lots of 100 flasks. London is £7 17s 6d.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, July 12.

No new developments have occurred to make the metal market interesting. The general situation is one of dullness; melters buying only from hand to mouth. Trade is slack in all lines and prices are of a sagging tendency. A number of zinc mines in the West are reported to have suspended operations on account of the weak demand. We have revised some of our prices and quote lake copper 12¾c to 13c for carloads and 13c to 13¼c for less than carload lots; casting, 12⅝c for carloads and 13c for smaller quantities. Pig tin is selling at 27½c to 28c, according to quantity. Spelter, 4.80c to

4.90c in carload lots. Sheet zinc, 5.90c for car lots of 600-lb. casks, and 6.15c to 6.20c for less than carload lots. Pig lead is unchanged at 4.20c for 50-ton lots, 4.25c for car lots, and 4.35c for less than car lots.

Further declines are reported in prices of old metals. Demand is quiet. We quote: Copper wire and heavy, 10¼c; copper bottoms, 9¼c; copper clips, 10c; red brass, 9¼c; red brass borings, 7¼c; yellow brass, heavy, 7c; yellow brass borings, 6c; light brass, 5c; tea lead, 3¼c; zinc, 3.40c.

PERSONAL.

Max McMurray, general superintendent of the American Steel & Wire Co.'s blast furnaces and steel works in the Cleveland and Pittsburg districts, has resigned to take charge of the blast furnace department of M. A. Hanna & Co., of Cleveland. Mr. McMurray has been connected with the American Steel & Wire Co. for the past four years, with headquarters in Cleveland. His successor is J. W. Carpenter, who has been superintendent of the Shoenberger works at Pittsburg.

Campbell Turnbull, of John Turnbull Jr. & Sons Co., Glasgow, Scotland, who have represented the Cleveland Pneumatic Tool Co. in the British Isles for about three years, was a visitor in Cleveland last week.

W. T. Grafton, superintendent of the ceiling department of the Wheeling Corrugating Co., Wheeling, W. Va., has resigned.

Superintendent J. L. Shearer, of the Ohio Mechanics' Institute of Cincinnati, has been re-elected for a term of three years. He sailed for Europe this week.

Ralph J. Venning, formerly advertising manager of the Cleveland Punch & Shear Works Co., has accepted the position of secretary of the Citizens' Transit Co., of Cleveland. This company has been formed to operate a line of electric passenger tonneau cars on the main streets and boulevards of Cleveland, using the Berg-Ledwinka type or motors, and the Edison storage battery. Charles Berg, who controls the patent rights on this equipment, is president and general manager of the new company.

Harry Wright, of Columbus, O., has been appointed district manager of the American Steel Foundries. He will succeed Harry Egan, of Pittsburg, and have charge of the Sharon, Franklin, Pittsburg and Alliance, O., plants.

Chas. M. Schwab sailed for Europe July 12 on the Kaiser Wilhelm II. His European trip is reported to be connected with an investigation of armor plate processes with a view to securing rights for the Bethlehem Steel Co., to which it is understood Mr. Schwab's energies will be largely devoted.

Fred Harris has severed his connection with the Rand Drill Co., of which he was sales agent in Butte and Salt Lake City.

The Harbison-Walker Refractories Co. has declared a quarterly dividend of 1 percent on its preferred stock, payable June 20 to holders of record June 11. This is a reduction of one-half of 1 percent, the company having paid at the rate of 6 percent on its preferred stock since its organization in October, 1902. President S. C. Walker states that owing to the depressed condition of business, the profits for the quarter ended June 30 were at the rate of 5 percent per annum on the preferred stock, and it was thought wise to temporarily reduce the dividend. The preferred stock is entitled to 6 percent cumulative dividends.

The work of dismantling the Girard hoop and bar plant of the Carnegie Steel Co. has been commenced and already several carloads of machinery have been shipped to Pittsburg, where they will be installed in other mills of the company. The plant at Girard, O., was built in 1872 with 23 single and 2 double puddling furnaces, 3 regenerative gas heating furnaces and 4 trains of rolls.

The Chemical Fire Engine & Mfg Co. has been incorporated at Cleveland with a capital stock of $50,000. The company will manufacture chemical fire engines for us in country towns and villages, and recently invented by C. D. Stone, of Cleveland. The incorporators are C. D. Stone, Fred C. Alber, W. E. Hamlin, S. S. Saffold, and E. J. Foster. The plant will be located in Cleveland.

OBITUARY.

Samuel M. Jones, president of the S. M. Jones Co., Toledo, and mayor of that city since 1897, died July 12. He was born in Wales Aug. 3, 1846, and was brought to the United States by his parents when a child of three years. He was engaged for a number of years in drilling for oil in the Lima, O., field, and was one of the incorporators of the Ohio Oil Co. In 1894 he established the Acme Sucker Rod Co., which was succeeded by the S. M. Jones Co. Mayor Jones' views concerning industrial strife were published in a communication to *The Iron Trade Review* of May 21, 1903, when his company was having trouble with the molders' union. He said in part: "I believe that we are passing through an interesting epoch in the history of the movement towards a more righteous social and political order. We all have much to learn, and while I can see that trade unionism has been an agency that has done much to aid in the education of working men, the institution has yet much to learn in order to get rid of the tyrannical methods of the old world ideas of government and adapt itself to the modern and American idea of democracy and the equal brotherhood of all men, including those who are outside of the union as well as those who are in. But inasmuch as I believe in *all of the people*, I have faith to believe that the leaders of the trade union movement will open their eyes to the inevitable, and broaden and Americanize and humanize their platform and their principles to such an extent that it will seek to accomplish its ends through the methods of love and peace instead of through the agencies of hatred and war."

Addison B. Dally Sr., 78 years old, was struck and killed by a train at Crofton, Pa., July 6. For many years he was general superintendent of the Sable Iron Works, of Zug & Co.

David Marchant, Chicago, died last week, aged 81 years. He arrived in Chicago from England in 1852 and obtained employment in the machine shop of P. W. Gates. Leaving there soon after and becoming a partner in the business of Fraser & Chalmers, he eventually sold his interest in that firm and devoted his time to the perfection of stone crushing and handling machinery. His greatest achievement was the building of a stone crusher with a capacity of three tons of stone a minute, which revolutionized the handling of limestone for blast furnace work.

Frederick R. Phillips, senior member of the firm of F. R. Phillips & Sons Co., iron and steel jobbers of Philadelphia, was swept from the deck of a steamship and drowned in the Straits of Gibraltar June 25. Mr. Phillips was an Englishman by birth, but had made his home in Philadelphia for nearly 20 years. Last year a branch was established in England and a few months ago Mr. Phillips went to that country to manage the foreign business of the firm. A vacation trip to Algiers resulted in his death. The deceased was 55 years of age. Reese Phillips, a son, is manager of the Pittsburg business of the firm and W. Vernon Phillips is connected with the Philadelphia house.

In a particularly well-printed booklet under the title "The Spirit of Progress," the National Acme Mfg. Co., of Cleveland, refers specially to progress as illustrated in the Acme multiple spindle full automatic screw machines and semi-automatic screw slotting machines. Some excellent illustrations are given of products of the "Acme Automatic" in milled work, particularly in milled screws. The statement is made that in the past 12 months this company has converted upwards of 5,000,000 lb. of iron, steel and brass into finish product.

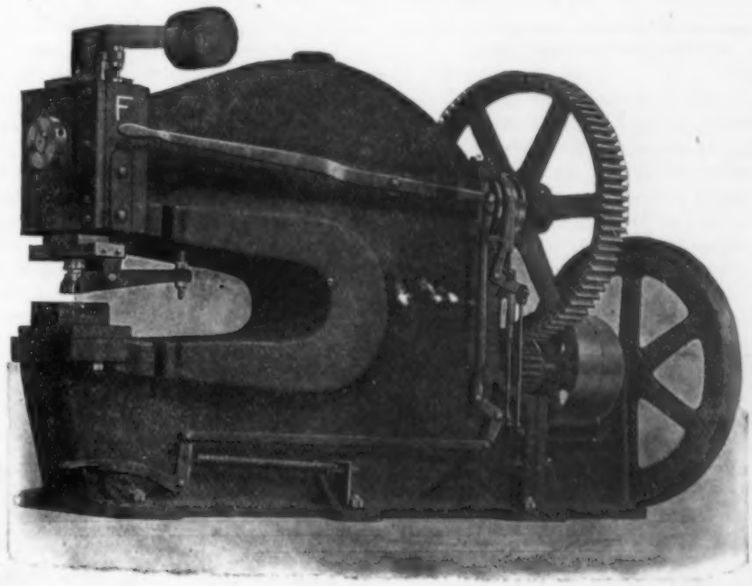
The Koepke, Sprague & Fauver Co., Elyria, O., was incorporated July 12, and has bought the East Bridge Street Machine Co.'s plant and will manufacture bolts and nuts. John Koepke, the senior member of the company, is the inventor of a machine for the making of nuts which will be used in the new concern.

The Ben-Steele Weigher Manufacturing Co., Peoria, Ill., has issued a catalogue explaining and illustrating its improved Ben-Steele grain weighers, loaders and "B. M." baggers. The machines are designed by one who is skilled in grain handling machines and are built under his direct supervision.

PUNCH FOR HEAVY WORK.

The Class F punch of Bertsch & Co., Cambridge City, Ind., is designed for work on heavy plates, the particular size represented in the illustration being capable of punching 1¼ in. in 1¼-in. material. The throat is 48 inches. The main body casting is cored and and the metal is so distributed as to give great rigidity and reduce shrinkage strains to a minimum. The sliding head is heavy, with wide bearings and fitted with a taper brass gib for taking up wear. The eccentric or driving shaft is made of forged steel, and the main bearings are long and brass bushed. The cam pintle is made of steel and brass bushed. The improved automatic clutch has steel faced jaws. When disengaged it is locked by both a steel and a safety lock, either of which will hold the clutch disengaged. Both must be released, as they work together, before the clutch can be engaged. It is positive and is disengaged by a hardened steel plunger acting against a cast steel ring. The treadle is easily operated, as it has no connection with the clutch, but releases the safety lock and plunger so that the spring engages the clutch; and not having the weight of the clutch it does not become laborious when operating the machine continuously. It has two feathers to avoid binding on the shaft. If the treadle is kept depressed the punch will run continuously.

An improved automatic stop attachment is furnished with the machines for successively stopping the punch at any desired position of the stroke. It is composed of an adjustable cast steel ring acting against a hardened tool steel roller on top of the stop plunger. These machines are built with either top or bottom drive.



PUNCH FOR HEAVY WORK.

Improvements at Cumberland, Md., Mills.

The electrical appliances recently installed at N. & G. Taylor Co.'s works at Cumberland, Md., illustrate well the economy both in time and labor brought about by modern mechanical devices. In the open-hearth department of this plant the heavy ingots from the furnaces are handled automatically throughout. Powerful overhead electric traveling cranes serve the open-hearth and bar mill buildings and auxiliary jib cranes cover an extensive radius of action for the lighter classes of work. In the bar mill department the continuous automatic ingot heating furnaces are fitted with the latest electrical charging and discharging machines. The regenerative principle has also been applied to these furnaces to utilize the waste heat of the escaping gases. A special type of roller table is used to convey the long bars from the water boshes to the motor-driven shears, the finished product being loaded automatically on cars by Link Belt conveyors, also especially designed for the purpose.

The company reports a heavy demand for its roofing tin. Of the twelve mills at Cumberland, eight are working day and night on the special grade of black plate used for this tin, the remainder on other kinds of black sheets for the company's use. All departments of the works, both at Philadelphia and at Cumberland, Md., are running full time.

Heavy Rails Laid in Philadelphia.

The Pennsylvania Railroad completed last week three tracks built of the heaviest rail used in the history of railroading. They are the Delaware avenue freight lines in Philadelphia, and were constructed for the use of the Belt Line, the Reading and the Pennsylvania roads, each of which was assessed one-third of the cost. The tracks extend from Race street to Washington avenue, and are intended to accommodate the fruit and produce commission merchants, as well as the heavier shippers of the city. The rails weigh 142 pounds to the yard, and are by 17 pounds heavier than any before used. They are ballasted in concrete and nine-inch girders were used to bind them. All the curves and spurs were made of the same heavy rails, and the tracks are considered superior to any railroad section ever undertaken. The rails were made especially for the Pennsylvania railroad by the Pennsylvania Steel Co. An officer of the railroad said that this section of roadbed will last for twenty-five years without repairs. It required three months to place the rails, and the whole street has been paved with granite blocks.

The Garry Iron & Steel Co., Cleveland, reports that business is good. Its roofing, eave trough and iron ore paint departments are especially busy. Among recent orders in the machine and structural departments are the following: Steel building for the Elyria Gas Engine Co., at Elyria; two steel buildings, one 70 ft. x 288 ft., and one 35 ft. x 45 ft., with corrugated roofs, for the Continental Cement Co., of Cassadaga, N. Y.; structural steel, sheet metal and stair work for the I. O. O. F. Orphans' Home at Meadville, Pa.; several roofs of steel construction for the Scranton Coal Co. and Price-Pancoast Coal Co., of Throop, Pa. The company has just shipped to the Indianapolis & Cincinnati Traction Co. one of its latest improved three-ton pneumatic pit racks, on car. It is now building for the Raritan Copper Works, of Perth Amboy, a three-motor special electric gantry transfer crane, of an entirely new and unique design. One of this company's No. 3 pneumatic revolving cranes was recently shipped to London, E. C. The company is now working on an order from the Canadian Railway Co. for ten thirty-ton pneumatic jacks with trucks, for use in its different shops in British Columbia and Assiniboia.

OVERHEAD TRACK FOR FOUNDRIES.

The expeditious carrying and pouring of molten metal in the foundry is one of the points of economy on which emphasis is properly laid in the equipment of a modern foundry. A system devised by the Wilcox Mfg. Co., of Aurora, Ill., secures the rapid handling of metal by means of ladles suspended from roller bearing carriers running on an overhead trolley track. This track is formed from sheet steel, by the use of powerful machinery, with an opening in the lower side through which passes the pendant carrying the load. The steel is bent inward at this point, forming a flat tread or base about ¾ in. wide, upon which the wheels of the carriers roll. It is found very advantageous to have this bearing quite broad, as the wear is reduced and friction eliminated. The track is attached to any kind of overhead structure by means of forged steel brackets. No cast iron is used, the track, as well as all the various parts of the switches, being Bessemer steel.

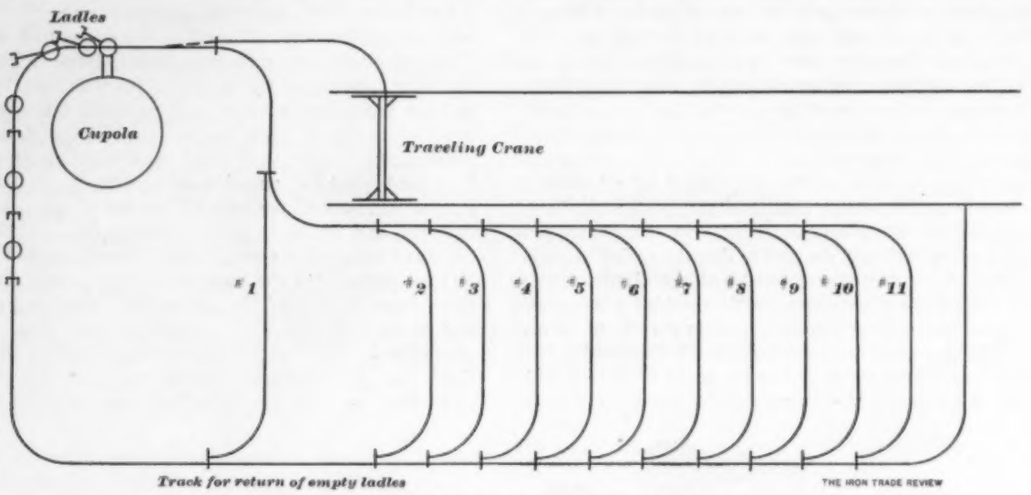


FIG. 1.—PLAN OF A LATE TRACK CARRYING SYSTEM.

are also connected by means of switches to the return track. Running parallel to the main track is a crane track with a traveling bridge crane, connected with the main track near the cupola by means of a switch and spur track.

The method of operation is as follows: The metal being ready the cupola is tapped and ladle No. 1 is receiving the metal, which may be run up to 500 lb. in each ladle. Ladle No. 2 catches the flow without stopping off; also No. 3, No. 4, No. 5 and others catch the flow in the same manner. As soon as workman No. 1 receives a ladle full he pushes his load along over the switch on to track No. 1 and begins pouring into the molds, which may be either in a double row or single. No. 2 switch is thrown by the boy who attends to the switching, enabling ladle No. 2 to pass on to that track, and so on for all the rest. As soon as No. 1 finishes he returns to the cupola and upon receiving his next load, will then run on to No. 6 track, perhaps, or any track where needed, thereby making the pouring continuous. The heavy work is left to the last, if thought advisable, and a large ladle run on to the traveling crane which is provided with a quick speed spur-geared hoist, so that the ladle may be raised any height for pouring. After the flasks have been broken open the castings are carried to the cleaning rooms by means of the same overhead trolley track and carriers, the ladles being unhooked from the carriers.

FIG. 2.—WILCOX CONVEYING TRACK AS INSTALLED IN THE LUNKENHEIMER CO.'S BRASS FOUNDRY, CINCINNATI.

In addition to the illustration of the system as installed in the brass foundry of the Lunkenheimer Co. at Cincinnati, Fig. 2, and the views of the switch and forms of carrier, we give in Fig. 1 a plan of one of the latest systems which is applicable to a foundry of any size and with modifications can be used with more than one cupola. There is the main track passing in front of the cupola and around the side, and also a series of branch or shunt tracks numbered from 1 to 11. They

The carriers being provided with case hardened steel roller

bearings operate very easily and it is stated that one man can carry 500 pounds of metal more easily with this system than he can take care of 100 pounds by hand. The wheel has a flat face, giving a longer wearing life for both wheel and track, the flat face wheel having a bearing of from ¼ in. to 2 in., according to the loads carried. Very little cast iron is used in the Wilcox track installations, as steel bends before breaking when subjected to shocks or when using a hoist or electric traction on tramways. All the supporting brackets are made of steel by special machinery and will not break. The tread of the wheel runs on the flat, hard surface of the track, which is just as the rolls left it in the process of rolling.

In the accompanying illustrations, Figs. 3 and 4 show carriers for straight and curved sections of track, respectively.

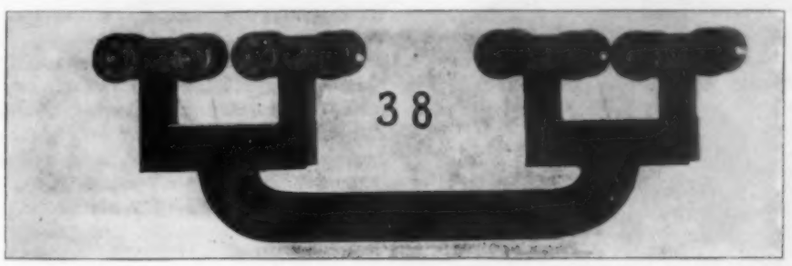


FIG. 3.—SIXTEEN WHEEL CARRIER FOR STRAIGHT TRACK.

Fig. 5 is a section of straight and curved track with two-way switch. The parts of the switch are given in Fig. 6, in which 30 is the two-way switch and supporting arm; 31, 32, 33 and 34 the brackets for supporting the end of stationary track, movable end of switch track, end of stationary track and pivoted end of switch track, respectively. At 35 is shown the bracket for closing ends of tracks, attached to 32, and 36 is the coupling lug for switch arm, attached to 32.

The manufacturers also furnish a double carrier with telescoping frame device for carrying large ladles. The device is provided with a powerful hand hoist for raising the ladle to any height for pouring, and the ladle is held automatically.

Cornelius Shields, former president and general manager of the Consolidated Lake Superior Co., has been elected general manager of the Lake Superior Corporation which succeeds the old company. Mr. Shields was also given instructions to resume operations in all the company's plants on both sides of the river as soon as they could be put in proper condition. This is a result of a visit of the executive committee of the board of directors of the company who spent last week at the Soo inspecting each of the plants and properties. According to the statement of President C. D. Warren, all the plants were found in excellent condition and the markets right to handle their products.

The board of directors of the Atlanta Tin Plate Co., Atlanta, Ind., has authorized the sale of $125,000 first mortgage 6 percent bonds in order to complete the plant. The following directors have been elected: Cortland Van Camp and H. B. Hibben, Indianapolis; J. M. Whisler, D. C. Hobbs, John G. Dunn and James Henderson, Atlanta; John Kemp, Tipton; John G. Smith, Goldsmith and Henderson Coppick, Ekin.

HIGH TEMPERATURE MEASUREMENTS—I.

BY S. H. STUPAKOFF.

The testimony of our senses as to the exact relative degree of intensity or the quantity or degree of the effect of any of the known physical agents or forces is absolutely untrustworthy. They are known to be the most unreliable advisors, as they mislead and deceive us in our judgment and give us quite frequently contradictory impressions of the true conditions.

Ordinarily we will rely upon our senses to inform us of the size, of the weight, the illumination, the distance, the heat and any one of other physical properties of objects; but to determine such quantities with any degree of accuracy we must employ especially constructed physical, mechanical or electrical instruments. Our senses were not designed to perform such functions, else we should find them altogether unsuitable for our immediate necessities.

Our touch and our sight may be specially trained and developed, but they will remain unalterably dependent upon specific conditions in surroundings, the state of health, and upon external and internal changes of the body in general.

These facts are easily confirmed by many examples of everyday occurrence. The manner in which our vision is affected by sudden changes of light, the apparent difference of luminosity of bodies when surrounded by a more or less intense luminous medium; the different sensations of heat and cold which are experienced when entering or emerging from a cave or a bath; or the effect of varying atmosphere upon the body, depending upon the seasons, or calm or windy, dry or damp weather, as also the effects felt when changing from a warm into a cold room or *vice versa*—all are deceptive impressions felt by the body, which are known too well to require further comment. A better example of even more striking proof is given us by the often cited lecture room experiment of placing one hand in a vessel with cold water and the other in a vessel with hot water, then withdrawing both and plunging them into tepid water, which will feel cold to one hand and warm to the other. And further, if different substances, such as straw, wool, wood, stone and metals, are exposed to the same high temperature, as for instance in the steam room of a Turkish bath, they all will feel differently to the touch, though we know that their actual temperature is absolutely alike. We are even more at sea with our judgment, when it comes to estimating the quantity of heat which different substances gain or lose by the change of their temperature, or by their passage from

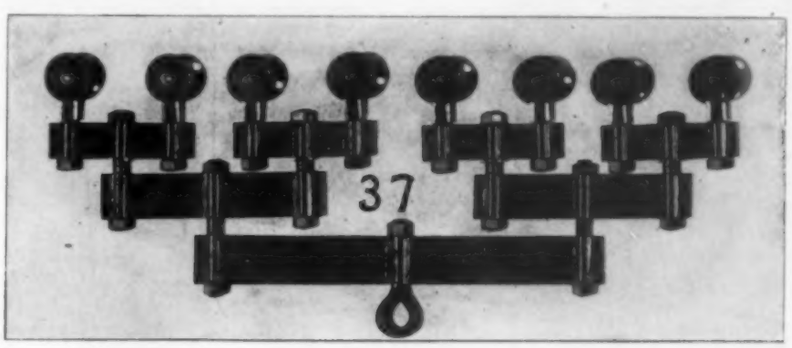


FIG. 4.—SIXTEEN WHEEL SWIVEL CARRIER FOR CURVED SECTIONS.

one state into another. Thus water at 32 degrees F. contains an excess of heat over that contained in the same quantity of ice at 32 degrees, which would be sufficient to raise this water from 32 degrees F. to 175 degrees F. Or in other words, to melt ice at 32 degrees F. into water of 32 degrees F. requires as much heat as is required to raise the same quantity of water through a range of 143 degrees F. or from 32 degrees F. to 175 degrees F.

Nearly all substances require a different amount of heat to

FIG. 5.—SECTION OF STRAIGHT AND CURVED CARRYING TRACK WITH TWO-WAY SWITCH.

change their temperature between equal limits. Thus, mercury and lead require about 1-30, aluminum about 1-5, iron about 1-9 the quantity of heat which is necessary to raise the temperature of water within the same range of degrees.

We have much evidence to show that the bare sight is but a very imperfect measure for determining the point of luminosity and the degree of the attending temperature. Objects illuminated to different degrees will give to the same individual but a vague notion of their actual brightness. The relative degree of illumination of two pieces of white paper, exposed to the light of a different number of candles will be estimated very differently by different persons.

striking examples of a similar nature. We know that steel and irons of different compositions, as the gray iron of our commercial castings and the white iron which is used in malleable iron practice, melt at considerably varying temperatures, which have been accurately determined by unquestionable authorities. Now it so happens that white iron, which melts at the lowest temperature of the series, appears to the eye by far the hottest. Gray iron in the fluid state may look red and dull, while white iron at 200 to 300 degrees F. lower temperature is dazzling white, and throws a shower of brilliant sparks when tapped from the furnace.

Luminosity is a very unsatisfactory gauge for temperatures, for different substances have different capacities for indicating their temperature by their degree of luminosity, and consequently the latter cannot serve as a measure for the former. Solid bodies which are difficult of fusion become luminous after they have absorbed a certain quantity of heat. Their luminosity increases with the increase of the temperature and changes gradually from dull red to white incandescence. The point of fusion has no relation whatever to the point of incandescence. Some bodies attain a clear white heat without fusion, while others, such as silver and lead, fuse before they become luminous. Mercury boils at 674 degrees F. (356.7 degrees C., Callendar & Griffiths) and it is certain that at this point it emits no sensible light, since it is perfectly invisible in a dark room. Antimony, which melts at 1,165 degrees F. (629.54 degrees C., Haycock & Neville) is just visible in the dark.

The literature on high temperatures is full of conflicting statements, for the very reason that too much reliance has been placed on the dicta of the senses. We should therefore accept old data with great caution. Only researches and determinations made within the last few decades are perfectly reliable up to the melting point of platinum, which is 1,780 degrees C. or 3,236 degrees F. We should make due allowance for the variations of earlier determinations, as investigators were not in possession of correct heat measuring methods, nor had they at their disposal accurate instruments designed and constructed according to correct physical principles. Modern pyrometers, however, are absolutely trustworthy and afford a true means of exact determinations and comparisons.

How much some of the pioneers of pyrometry varied from each other, and how much they erred in their figures, is to be seen by some of the data which they have handed down to us.

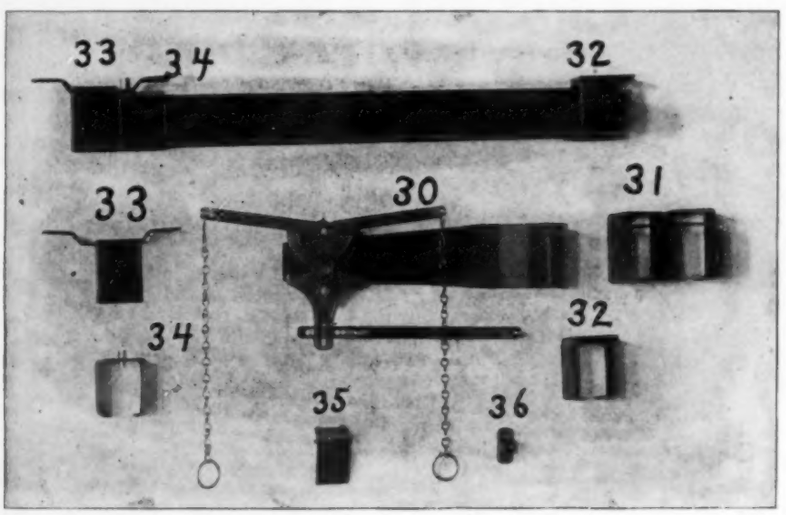


FIG. 6.—DETAIL OF PARTS OF TWO-WAY SWITCH.

Let a furnace be heated to approximately 600 degrees C. and introduce a gas flame of sufficient spread and luminosity into the interior. Its walls and all its contents will appear dark, almost black. Now turn off the gas and the brick walls will appear distinctly red hot, while iron portions distinguish themselves by a brighter hue. Nobody could approximate the true temperature under these or similar conditions, unless equipped with the necessary heat measuring instruments.

In ordinary foundry practice we meet quite frequently with

Newton fixed the point of incandescence at 645 degrees F. = 335 degrees C.

McDaniel fixed the same at 980 degrees F. = 527 degrees C.

Sir Humphrey Davy the same at 812 degrees F. = 433 degrees C.

Pouillet gives the melting point of antimony at 432 degrees C.; silver at 1,000 degrees C.; gold at 1,180 degrees C.

Recent determinations give for antimony, 630 degrees C.; for silver, 961.5 degrees C.; for gold, 1,064 degrees C.

Wedgewood estimated the melting point of iron at 10,000 degrees C. Whereas it is now well known that the range of melting points of all cast irons falls between 1,075 and 1,255 degrees C.

Wrought iron melts at a somewhat higher point (Pictet), 1,505 C. And even the highest temperature in a Bessemer converter, which was observed by Prof. LeChatelier, did not reach 3,000 degrees C. The celebrated Father Secchi estimated the temperature of the sun at 1,500,000 degrees C. From this value downward we have a great variety, as low as Violles, for the same source of heat, 1,500 degrees C.

It would be vain if we should attempt to enter in this place into a speculation as to which one of the latter two values represents the correct, or at least the most probable, measure. These figures are merely quoted—alongside of a few others which are within our reach—as a striking example of the utter impossibility of establishing the degree of temperature, and for that matter the degree of intensity of any one of the known physical agents, without the aid of reliable physical instruments. And to be reliable, such instruments must have been constructed according to correct physical principles, besides representing the highest class of workmanship and the most careful selection of materials which enter into their construction. Otherwise they could not give us exact proportionate measures in their application.

While it is true that the degree of luminosity does not vary in the same ratio as the degree of temperature, it should be evident from the above that the point of incandescence with reference to the accompanying temperature differs in different substances; and, therefore, if we speak of a temperature indicating a certain degree of luminosity or incandescence, we should not omit to mention the material which was observed under the given conditions. By so doing we would not violate the fundamental principle of Kirchoff's law which has established the fact that "all phases of matter produce a set of bright lines in the spectrum, no two sets being alike."

The Anniston plant of the Southern Car & Foundry Co. is now the property of the Illinois Car & Equipment Co. The question which has been involved since the Southern Car & Foundry Co. went into bankruptcy was the ownership of the new machinery installed by this company since its lease of the plant on June 1, 1893. The lease on the plant by the Southern Car & Foundry Co. expired last April, and the disposition of about $80,000 worth of machinery and improvements could not be agreed upon, but now an agreement has been reached by the creditors of the defunct company, receivers, and the Illinois Car & Equipment Co. whereby the latter company comes into full possession of the plant and machinery in question. The papers have all been signed and are now in the possession of Judge Willett. This agreement places, for the first time since the company failed and the property reverted back to the original owner, the Illinois Car & Equipment Co. in a position to lease or sell the property. It is understood that negotiations are in progress for the resumption of operations under Capt. J. M. Elliott, former president of the Southern company.

The city of Milwaukee continues to have trouble in making a contract for its new 20,000,000 gallon pumping engine. After the former bids were received Mayor Rose announced that he "would rather have soup houses in Youngstown than in Milwaukee." He was opposed to awarding the contract to the Wm. Tod Co., of Youngstown, O., which was the lowest bidder. In place of bidding under the second advertisement, the Wm. Tod Co. submitted a communication stating that in its opinion the action of the city board was without reasonable justification and forced the company to the conclusion that proposals were not desired from outside manufacturers. Hence, as competition had become a farce, the company declined to bid. Three other companies bid, but there are some questions as to regularity and the contract has not been awarded.

E. A. Holden, of Lansing, Mich., has purchased at auction the plant of the Peninsular Mfg. Co., Ann Arbor, Mich., paying $6,300 for the real estate, machinery, material and accounts up to Feb. 24. The business will be continued.

A FORM FOR ROLL RECORDS.

The United Engineering & Foundry Co., Pittsburg, is sending to the users of rolls a valuable card, herewith reproduced, which in a simple manner suggests a method of recording a complete history of the life of a roll. A blank space on one of the upper corners of the cards is for the recording of the roll number as kept by the mill. A line is provided for recording the kind of mill on which the roll is used and the department in which the mill is located. Other spaces are provided for the number of the roll as stamped by the foundry from which it was received and the name of the foundry. The depth and nature of the chill, dimensions and position of the roll in the mill can also be noted as well as the causes of the failure of the roll, diameter when received from the foundry and the date of receipt. A simple method is provided of recording the dates when the roll was put into the mill, the time in use, when taken out for dressing, the total time in use in days and turns, diameter after each dressing and tons rolled, and spaces are left for remarks. This card provides a means of keeping a complete story of the work

UNITED ENGINEERING & FOUNDRY CO.
ROLLS AND ROLLING MILL MACHINERY
Farmers Bank Building PITTSBURGH, PA.

MILL ROLL NO. _____

_____ Mill _____ Mill Department

No. or Date on Roll _____ Made by _____

Depth and Nature of Chill _____

Dimensions of Roll _____ Position _____

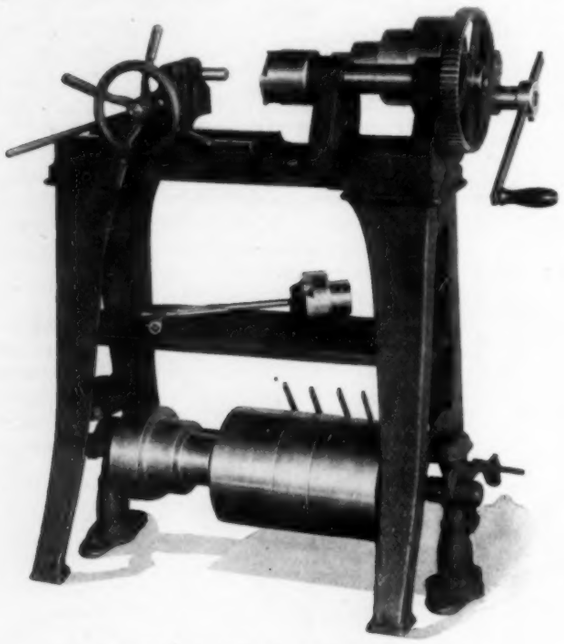
IN		OUT		TOTAL TIME IN USE		DIAM.	TONS ROLLED	REMARKS
DATE	TIME	DATE	TIME	DAYS	TURNS			

BOLT CUTTING AND NUT TAPPING MACHINE.

This machine is designed for threading bolts and nuts up to ¾ in. in diameter and is rapid and accurate. There are three changes of speed, arranged with three-step cone pulley for 2½-in. belt, the shaft being parallel with the spindle. To this shaft is splined the small gear which drives the large gear on the spindle at a ratio of 5 to 1. A third gear with head for an adjustable handle is also supplied to enable the machine to be run by hand when power is not available. This can be removed when not in use. Gearing is cut from the solid.

The spindle is hollow, allowing work of any length to be cut and pass through. The sliding carriage for holding the work is planed to line accurately with the spindle insuring true cutting of threads; it is also supplied with fine hardened cast steel grips set into the jaws and which may be removed and replaced when worn. Jaws are connected with a 1-inch steel operating screw with hand wheel attached. A chuck with hardened cast steel jaws is also supplied for holding taps. The bed of the machine is made as a trough in which the chips and oil are caught.

This machine is furnished with countershaft having tight and loose pulleys 9-in in diameter for 3-in. belt as shown, also with patent friction countershaft. The weight of the machine is 375 pounds. It is also furnished with the single



BOLT CUTTING AND NUT TAPPING MACHINE.

driving pulley on the spindle without gears and with balance wheel and handle for light work of small dimensions, also for hand power alone with gearing on the operating side of the machine.

The manufacturers are Boynton & Plummer, of Worcester, Mass.

J. W. Duntley, president of the Chicago Pneumatic Tool Co., returned July 8 from a trip to Europe. The Consolidated Pneumatic Tool Co., Ltd., of England, which is owned by the Chicago company, will hereafter be directly managed by it, and the earnings will go to Chicago instead of being used for further construction work in England. Mr. Duntley says he placed a number of heavy orders abroad. He found business poor in England, but on the continent, especially in Germany, conditions are improving. Shipyards are taking advantage of the present inactivity to introduce the tools of the company and compel the labor unions to accept them, which was found difficult to do when there was a large demand for labor.

The Minneapolis and St. Louis railroad has completed specifications for orders for 500 box cars to be built by the American Car & Foundry Co. The cars will be 60,000 pounds capacity.

RAILROADS IN CHINA.

According to the *Kolonial Zeitung* of June 9, 1904, a new railroad was opened to public traffic in Shantung, China, on June 1. Although other roads were built and operated in China previously, this road has a deep significance at this time. Work during 1903 had been urged forward so as to finish it within the time agreed upon for its completion when the right to build the road was conferred by the Chinese Government. The full payment, therefore, in series of shares of the nominal value, each series, of $1,428,000, was called for; so that Jan. 1, 1904, saw the full amount, $12,852,000, paid up. By 1902, 129.24 miles had been built between Tsingtan and Tschang-loh-sien. By March 1, 1904, 223.69 miles were in operation. Finally, on June 1, the main line of 241 miles, and a branch to Schetochuan from Tschangtien of 11.18 miles, was opened.

During 1902, 4,280 passengers were carried each week and 256 tons of goods were transported. In 1903 the number of passengers carried weekly was 6,813 and the amount of goods 818 tons. In 1901 on an average of 40.38 miles the traffic was 59,912 passengers and 5,473 tons of merchandise; in 1902 on an average of 105.63 miles the passengers numbered 221,197 and the merchandise amounted to 13,845 tons; in 1903 on an average of 157 miles the passengers numbered 363,343 and the merchandise amounted to 44,962 tons.

RECEIPTS FOR THREE YEARS.

Year	Passengers	Freight	Total	Receipts per mile
1901	$30,819 31	$16,181 87	$51,868 12	$946 00
1902	110,937 24	91,359 85	211,425 29	1,989 89
1903	212,184 73	205,496 60	442,239 65	2,796 77

RUNNING EXPENSES FOR THE THREE YEARS.

Year	Total Expenses	Expenses per mile
1901	$75,008 43	$1,368 30
1902	236,991 45	2,237 80
1903	289,253 60	1,829 28

The receipts for 1904 will be much larger than for the last or for any previous year, for the amount taken in for the first five months of the current year was already $400,000, or nearly as much as the total for the year 1903. The exhibit is of much interest for what it suggests as to the possibilities in the Oriental awakening that is one of the great facts in 20th century development. The American steel trade has this to look forward to as an advance in which it will play no insignificant part.

Decreased Traffic at the Soo.

The annual report of the traffic through St. Mary's Falls canal for the fiscal year ended June 30 has been made public, and it shows a marked decrease in tonnage through the gateway to and from Lake Superior. The report for June, 1904, shows the total freight tonnage for the month was 3,139,236; vessel passages were 1,183. The total freight tonnage for the season up to and including June 30, the end of the fiscal year, was 3,589,156, as against 11,944,934 for the corresponding period last year, or a decrease of 8,355,778. The report of the canals for the year ended June 30 shows that during the year the aggregate freight tonnage was 26,318,659, as against 36,419,579 tons for the year previous, a decrease of 28 percent. The report also shows that there was a decrease of 22 percent in passengers, 33 percent in registered tonnage, 25 percent in lockages and 31 percent in passages.

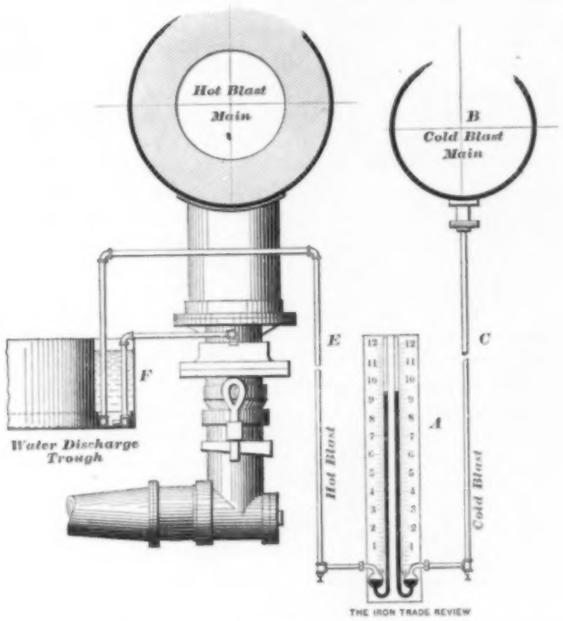
Concerning the Pacific Steel Co., of San Diego, Cal., which it was announced some time ago had been organized with a capital of $50,000,000, it is now stated that for the preliminary financing of the company $150,000 has been raised and is in the hands of the pooling committee, which will hold all the issued stock, common and preferred. The members of the committee are Homer H. Peters, U. S. Grant and G. W. Fishburn.

The Cleveland Motor Co., Cleveland, bankrupt, has filed a statement showing that its assets are nothing and the liabilities are $22,120. The company was incorporated to manufacture touring cars with sleeping car attachments.

PYROMETERS FOR METALLURGICAL WORK.

Axel Sahlin, of London, Eng., has contributed the following to the discussion on pyrometers which was started at the May meeting of the Iron and Steel Institute:

The pyrometer has at this meeting been discussed from the scientific point of view, from the point of view of the steel melter, the iron works manager, and from that of the iron works chemist. There is, however, another class of men from whose standpoint it might be well to study the requirements of a good pyrometer, *i. e.*, the practical blast furnace foreman or keepers, the men who have to read the pyrometer during dark nights, in storm and rain, in heat and cold, and act on the readings promptly, and as the blast furnace at the moment may require. It is evident that for these men a pyrometer requiring calculations in order to obtain the temperature in plain figures has no practical value, and even a pyrometer which gives the temperature of the blast at a certain point and at a certain time, or even one that in addition records the temperatures at this point continuously during the previous 24 hours, is, though valuable, not an infallible guide. At least, in making gray iron, the rule, employing expensive fuel, is to give the furnace all the heat which it will take, or which the stoves will give. We may—as is usually done from experience—arrive at the temperature



THE SAHLIN BLAST FURNACE RECORDER.

which a certain furnace, under ordinary conditions, will take without hanging; but the conditions will from time to time change without giving notice that such a change is preparing or taking place inside the furnace. The pyrometer can give no warning, and the fact that the number of degrees read on it are below the average under normal conditions is no warrant that the heat is not in excess of what is required or suitable for the furnace at that particular time.

What the practical blast furnace foreman needs, in addition to, and in connection with, a plain and simple pyrometer which can be instantly read, is an instrument which will tell him whether the furnace is getting too much, just sufficient, or too little heat at any given time, and which will, therefore, enable him at the right moment to adjust the blast temperature to prevent threatening interruption of the regular working.

Our chairman has rightly called attention to the fact that it is by a free exchange of experience that we secure general progress. I, therefore, take pleasure in describing a blast furnace pyrometer, which does not give the temperature, but tells whether a blast furnace will require more or less heat. The exact temperature can and should, in addition, be recorded by any one of the excellent pyrometers which have been described in the paper we are discussing. From the day of my earliest experience with blast furnaces, I have now and then on reaching the works in the morning, been told by the foreman or keeper that the furnace was working a "little stiff." Just how stiff the furnace was working or how long the obstructions (i. e., the stiffness) had been forming, the workmen never could tell. Nor did the record of the blast pressures kept in the blowing engine house give a sufficient guide, because the resistance of the furnace would necessarily change with the fineness of the ore, the composition of the slag, and alterations in the mixture. I therefore was led to devise a very simple instrument which has given excellent satisfaction and which I believe is original in its application.

Referring to the annexed illustration it will be seen that this instrument consists of two open mercury gauges A, placed side by side over a graded scale marked in ½, ¼ and ⅛ lb. of mercury column. The bulb of one of these gauges is connected by pipe C with the cold blast main of the furnace B. The bulb of the other gauge is similarly connected with the interior of one of the nozzles of the hot blast pipe D, to which the gooseneck for a tuyere is attached. This connecting pipe E is cooled by being partly immersed in the discharge water trough of the furnace F.

In experimenting with this apparatus it was noted that as soon as the blast was turned on the furnace, the cold blast showed a pressure somewhat higher than that shown on the hot blast gauge. If the furnace was hanging, and, therefore, would not take the blast, the two pressures would be practically equal. If the furnace was working regularly, the difference in height of column varied for different furnaces from 1½ in. to 2 in. If the zone of combustion had risen too high in the furnace the difference between the two gauges might be up to 2½ in. or 3 in. We soon found the proper difference in pressure between the two gauges, which corresponded to the normal working for each separate furnace. We also found that if we increased the blast temperature the difference between the two mercury columns was decreased. If, again, cold blast was admitted, the difference was rapidly increased. The difference in the height of the mercury columns would at any moment indicate just how stiff the furnace was, or, in other words, how much resistance the furnace offered against the blast.

Our practice was for the keeper and stove tender frequently to observe the mercury gauges. If, as was sometimes the case after casting, the furnace would not take the blast, such a fact was at once indicated by the gauges. To restore normal conditions, it generally sufficed to open the cold blast connection for a quarter of an hour. In blast furnace practice it is all important to judge correctly and act promptly. We found that this easily read and understood instrument for ascertaining the working of the furnace gave a more reliable guide for conducting the operations than the reading of exact temperatures.

There would be little difficulty in arranging a similar instrument which would make graphical continuous records of the two pressures, thus enabling the scientific manager to make history; but for the man who actually operates the furnace, what is going on and what is going to happen is more interesting than what actually did happen 24 hours ago. The latter we cannot change; the former we are at all times endeavoring to ascertain and to control.

The Lackawanna Steel Co. is using a new style of coke cars. They are somewhat of an experiment and are being operated on the Buffalo, Rochester & Pittsburg, between the mines of the company and the Lackawanna steel plant. They have a cubic capacity, level full, of 3,295 cubic feet, or about 100,000 pounds of coke; their capacity with a 30 degree heap is 3,749 cubic feet, or about 114,000 pounds of coke. The cars were built for a maximum load of 60 tons of coke. The car weighs 38,100 pounds. Expanded metal is used on the sides instead of plates, thus saving upward of 2,000 pounds in the weight. There are three hopper doors on each side, each 4 feet 9 inches long, by 2 feet 9½ inches wide, hinged from the side. The winding shafts for each pair of doors extend clear across the car, but are operated only from one side.

The Prouty Wire Co., Charlton, Mass., has sold its plant and probably will retire from business. The company was organized a few months ago to manufacture high grades of wire.

MACHINE GRINDING.

Any one who has ever stood by the side of an iron-planing machine or lathe and watched it slowly slugging off, or, what is worse, perhaps, if the job is a hurried one, see it tediously skimming the surface for a finishing cut, must have wished that there was either another way of doing the work, or that the machine could be speeded up to get along a little faster, no matter whether he was pecuniarily interested or not. It seems a great waste of time to do so little; other people think so too, and reduce the amount of stock to be removed to its lowest terms, which does not expedite the work in the least. It takes just as long, so far as the speed of the tool is concerned, to remove a sixty-fourth of an inch as it does to remove a quarter of an inch. Quicker feed can be used on the finishing cut, certainly, but the loss of time is in the type of tool employed on the work. Matters have been expedited somewhat by the introduction of new tool steels of late, but there are some drawbacks to the use of them upon the equipment of machine shops generally, the old tools not having power enough to take the cuts that the steel will stand. If it is necessary to get a new outfit of machine tools to use a better steel, old shops will be handicapped for some time to come. The milling machine is the alternative of the planing machine on regular work, but it can not compete with the latter for jobs of all sorts that come to machine shops usually, and the cutters lock up a good deal of money.

It comes to this, then, that we must subdue our enthusiasm and stick to the standard machines, or take a chance with still another agent, and that is the grinding machine, which has undoubtedly a future before it. Recent improvements in the capacity and range of the grinder render it available for both large and small work in manufacturing and repair work as well, from chilled rolls 12 inches in diameter down to a quarter-inch rod. If proper precautions in the management of the grinder be taken there is no tool that can compare with it in truth of surfaces, and persons who are skeptical as to this fact may quickly satisfy them by turning a shaft in a lathe, smoking it in any way, and then putting the shaft in a grinding machine; the irregularities left by the lathe tool show in a most surprising manner. The first grinding machine was undoubtedly a grindstone, and even that is no mean adjunct now to finishing metals in the hands of skilled workmen. I have seen gun barrels "turned" on grindstones by merely screwing a dog on one end by which to handle them—which would caliper remarkably well as to rotundity and size. Cutlery never sees any other tool than grinding machines of one sort or another. As regards accuracy of surface and dimensions the machine grinder will do splendid work in the hands of those who know how to run it. Rolls for certain purposes have to be as nearly perfect as human hands can make them, and it is wholly within possibility to grind a pair of rolls, superpose them with slips of the thinnest tissue paper between and have the rolls "bite" them everywhere; not one can be withdrawn without breaking it. This comes pretty near absolute accuracy. But grinding machines have peculiarities of action which it is necessary to know before undertaking their use. Abrasion causes heat; if this is even sensible heat, perceptible to the touch, there will be a change of dimension in the work caused by expansion in different parts. On the start the shaft, or whatever the job may be, is cold, but as the emery wheel traverses the heat increases and the shaft gets larger, so that by the time the surface is finished there are various dimensions when the metal is cool again.

A great variety of work can be done on the grinding machines already in market, but for the average small machine shop all over the country the cost of these tools is prohibitive. They are finely fitted up with every appliance for adjustment at certain angles and for plane and parallel work besides; but certain specific classes of work can be done by very simple machines. Take the case of lathe handles, for instance. The whole of the surface on them can be skinned over, so to speak, from the drop-forging by an emery wheel, the machine to which it is attached having formers conveniently fastened to the carriage, so that ordinarily intelligent boys or handy men can run them. Aside from this detail, which is only mentioned as an example, there are quantities of other jobs, particularly in mechanics' and carpenters' tool shops, which can be executed on a simple tool which could be sold at a low price.

Joseph Horner, an English mechanical engineer and toolmaker, has paid much attention to the grinding machine, and gives some points in engineering which are worth noting. An objection to the method itself has been made by some who urge that the natural wear of an emery wheel would militate against accuracy of dimension, but Mr. Horner says, on this head, that mistaken notions exist as to the amount of wear of wheels. Under certain conditions wheels will show wear during long roughing cuts; this will happen if the work is speeded too high and the wheel is forced too hard. It will also occur if the wheel is too soft, but with proper management these things should not be allowed. A wheel should not show wear even in a long roughing cut and none whatever in a finishing cut. The wear is controllable to such an extent that it should not be noticeable in doing a large number of pieces of the same kind. One surface speed should not be used upon all kinds of work. Neither is one kind of wheel suitable for all classes of jobs at different speeds; this can be done, but it is not wise to undertake to cut iron, steel and brass on the same wheel, for the time spent in changing wheels is more than made up by the better work done when the wheel is suited to the task in hand. Even on the same material the wheel may need to be hard or soft according to the character of the work to be done, either slow or fast cutting as exigencies may demand, and, in some cases, depending upon whether the machine itself is light or heavy; uniform speeds are not adhered to any more than on lathe work. Specifically the speed of the work should not exceed in revolutions from 10 to 40 feet per minute; 100 feet and over is too fast. The grinding machine is in its unappreciated stage, and has yet to obtain its proper place in machine shops.

It is asserted by a manufacturer of emery wheels that it is possible to remove one cubic inch of steel per minute from cylindrical work with proper wheels, and this is by no means the limit of capacity. The Brown & Sharpe Mfg. Co. illustrate the difference between turning in a lathe and grinding with an emery wheel by the fact that in the latter there are, approximately, 2,500,000 cutting points on a wheel 18 inches diameter by ¾-inch face which pass over from 1 to 4 square feet of surface per minute, while a lathe has but one cutting tool at less speed superficially in a given time.

The practice at present is to rough-turn shafts before grinding them, the allowance for the latter operation being a full sixty-fourth of one inch. Sometimes a finishing cut is taken in the lathe, but this is a waste of time and does not give good results, because the temperature is less likely to rise on a rough surface than upon a smooth one. Rough-turning work for a grinding machine should be done with coarse feed, the coarser the better, within reason, for under these conditions the grinder does its best work. The important point is to rough-turn liberally, and grind lightly, never the reverse of these processes.—[Scientific American.

The Alabama Consolidated Coal & Iron Co. offers for exchange and purchase to preferred stockholders of record July 9, 1904, $1,500,000, 5 percent, 30-year, gold bonds, which were authorized to be issued for this purpose at a meeting of the stockholders last January. Each holder of preferred stock will have the privilege of exchanging for bonds at par an amount of preferred stock equal to 50 percent of his holdings, but as a condition of exercising this right each stockholder must subscribe at 90 and interest for a further amount of authorized bonds equal to 40 percent of the amount exchanged for preferred stock. Adjustment of interest on all payments is to be made on the basis of 5 percent per annum. Payments are to be made as follows: On or before July 30, 50 percent; Oct. 31, 25 percent; Jan. 1, 1905, 25 percent. The preferred stock will be exchangeable for bonds after the first of these instalments has been paid.

The King & Hamilton Co., Ottawa, Ill., manufacturer of corn shellers, cultivators and wagons, has sold its plant at Morris, Ill., and will remove its equipment to Ottawa, where it will have more room and better facilities for doing business. The company will incorporate under the name of the Ottawa Foundry Co. It expects to be prepared for business at its new location within 90 days.

THE LUNKENHEIMER EXHIBIT AT ST. LOUIS.

In machinery hall building, 5 G, block, 26, is the exhibit of the Lunkenheimer Co., of Cincinnati, easily identified by a large model of the company's familiar valve in hand, which occupies a prominent corner of the exhibit. Pyramids of globe, angle cross, lever and gate valves, of various designs and sizes, both brass and iron, are arranged about the exhibit, and are off-set by a black plush curtain at the side and rear. The glass cases arranged in front of the exhibit contain a smaller class of the goods manufactured by the company, such as lubricators, oil and grease cups, cocks, etc., of all sizes. Neat designs of racks contain various sizes of whistles, injectors, pop valves and a variety of other specialties. A new design of water gauge and an oil pump for cylinder lubrication are features in themselves. Dispersed about the exhibit are pipe fittings, together with whistles, safety and check valves and numerous other appliances.

TRADE PUBLICATIONS.

The Hanna Engineering Works, Chicago, have issued catalogue No. 3 describing four classes of riveting machines on the market and dwelling at length upon the merit of the Hanna compression yoke riveter. Illustrations showing a number of sizes and styles of these machines are given.

The Lennox Manufacturing Co., Marshalltown, Iowa, has issued a catalogue describing at length the "Torrid Zone" furnaces, which are made of steel in nine sizes for hard or soft coal and wood. While the catalogue is devoted principally to these furnaces, it gives much valuable information on furnace heating in general together with some practical suggestions for the installing and operating of furnaces to the best advantage.

The Electric Controller & Supply Co., Cleveland, has issued ten bulletins, neatly printed and elaborately illustrated, describing the following products of this company: Resistance units, controllers, brakes, solenoids and electro-magnets, fittings, lifting magnets, magnetic clutches, improved motor drive for planers, type "MT" controller and magnetic switches.

The Niagara Machine & Tool Works, formerly the Niagara Stamping & Tool Co., have issued a new catalogue describing their machines and tools for sheet metal workers. Among their specialties are the Niagara Keystone bar folder, Niagara adjustable pipe folder and the Niagara bottom flanging machines.

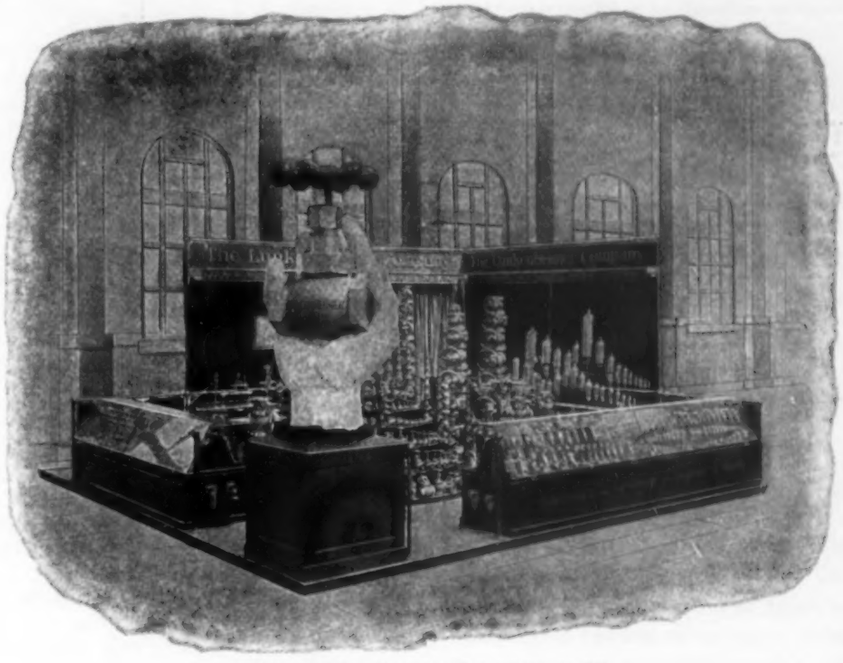
The General Pneumatic Tool Co., Montour Falls, N. Y., has issued a four-page pamphlet giving illustrations of its machines and operations. Special prominence is given to the machine which drives all the rivets in the plate girder without turning it over.

The Blaisdell Machinery Co., Bradford, Pa., in its bulletin 11, describes classes AA and AD single air compressors. A list of recent purchasers of Blaisdell air compressors is included.

H. H. Mayhew Co., Shelburne Falls, Mass., has published a new catalogue of tools which it manufactures. Among its specialties is a screw driver with two blades. This double blade is pivoted in the center, allowing either end to be used by simply pushing the other end into a malleable iron socket.

The Stephens-Adamson Manufacturing Co., Aurora, Ill., manufacturer of elevating, conveying and power transmitting machinery, has issued a general catalogue, 6x9 inches, in accordance with the specifications of the American Society of Mechanical Engineers. It contains cuts and dimensions of the machines which this company manufacturers, and is prepared with much care. The cuts are especially fine in detailed work and the book is exceptionally well printed.

The latest publications of the Wilson Laundry Machinery Co., of Columbia, Pa., are 9 x 11-inch pamphlets describing the various forms of laundry machinery manufactured by this concern. In "A Story of Success," which is a preface to the May catalogue, the company refers to its establishment in Philadelphia in 1882, with 1,000 sq. ft. of floor space. In 1886 a larger building was occupied containing 4,000 sq. ft. of floor space. The Wilson Laundry Machinery Co. was incorporated in 1889, when the concern moved to Columbia. Additional buildings were later erected, and the company started its own foundry. Successive additions were made in 1887, 1900, 1902 and 1904, the latest being a machine shop 50 x 200 ft., with 35 x 43 ft. ell, giving 11,500 sq. ft. additional floor space, with new equipment, including power and heat. The plant now covers more than an acre of ground. Electric power and light for the entire works are supplied from the company's own power plant. The officers are the following: Wm. B. Given, president; O. M. Hoffman, treasurer; C. W. Bender, secretary and manager; and E. G. Smith, superintendent.



THE LUNKENHEIMER EXHIBIT AT ST. LOUIS.

"Twentieth Century Machine Tools" is the title of a 66-page catalogue, standard size, just published by the B. F. Barnes Co., of Rockford, Ill. Several improved machines are described in addition to those which were illustrated in previous catalogues, one of the latest being a two-spindle, 14-inch manufacturer's drill, with one spindle equipped with this company's automatic revolving chuck. The company was organized in the latter part of 1899 and its development has been continuous and marked.

The Baltimore Gas Machinery Co., 14 W. Lexington street, Baltimore, describes its suction gas producers in a 12-page folder just received.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.

1060-1068 ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer.
JOHN A. PENTON, Vice-President.
A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - EDITOR.
ROBERT L. CLEGG, - - EDITOR MACHINERY DEPARTMENT.
GEORGE SMART, - - - ASSOCIATE EDITOR.

CHICAGO: 1164 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Manager.
THE CENTRAL WEST: R. A. EVANS, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

JULY 14, 1904.

THE FIELD OF THE STEEL FOUNDRY.

The *Journal* of the American Foundrymen's Association said in a recent issue:

A veritable fever for establishing Baby-Bessemer plants seems to be raging in Europe at the present time. It is as if a microbe had bitten many gray iron and malleable founders, and caused them to add these plants to their establishments and thus enter into fierce competition with existing steel foundries. The results are natural. Failure everywhere. The idea of Bessemerizng iron to make steel was only perfected by its illustrious author by the application of science and consummate skill. Others had failed to get his results while trying his methods. They missed the little points. So here also. The Baby-Bessemer process in itself is all right, but must be carried out with even more skill than is required for its big brother, otherwise commercial failure is certain to result.

There has been some of the same failure and disappointment in the United States, but these experiences have been of value in making others doubly sure of their ground before entering an untried field. Some excellent results have been attained where the proposition was approached with the proper outfit of experience and the proper appreciation of the limitations of the small Bessemer converter. There have been failures, too, in the malleable field and in steel casting manufacture where the expensive open-hearth outfit was employed. In fact, there has been shown by some companies that have essayed these lines a fatuous confidence that large profits were to be had for the entering in and taking. The allurements of mettallurgical operations in general have been sufficient to tempt many incompetent and inexperienced investors, who recklessly underestimated the necessity of expert service. The foundry industry in all its departments is conspicuous for the failures that have come to men who have been driven in by covetousness of the profits made by a few. The importance of management as the great factor in earnings, exceeding local advantages, proximity of markets, connection with consuming interests and a dozen other elements ordinarily cited as sure to bring success, is wofully underestimated.

The caution quoted above is timely. So far as the steel casting industry is concerned, whatever the process, the ranks are now fairly well crowded and promise to be so for some time to come.

RAILROADS AND THE MONEY SUPPLY.

The plethora of money in New York is pointed to frequently as one of the signs of coming improvement in industry; and it is a well known fact that accumulations of money that finally tires of idleness are a condition precedent to industrial revival following a depression, or even a period of rest unattended by serious depression—a period such as the country is now passing through. But it may require more than a few months or even a year of cheap money to bring about a new period of prosperity after one such period has been terminated by the follies of its own begetting. And with cheaper money there must also be cheaper commodities—cheaper materials of construction and cheaper—particularly more efficient—labor. So long as prices are held up on the plea that there is not enough chance to do business to warrant putting them down, so long is it practically admitted that the country is not ready for another forward movement. In this connection the needs suspended over the money market are not to be lost sight of. What will take precedence of any great extensions of credit to new enterprises will be the absorption of the large issues of bonds which the railroads have yet to place for the completion of their vast programs of improvement, to which there seems literally to be no end.

The following expression from the leading counsel of a Western railroad system has some suggestions on this subject that are worth considering:

"A few years ago I looked forward to the time when railroad credit in this country would be upon a 3 percent basis. I figured that in 1905 the railroads would be able to borrow money at not far from 3 percent on their long term bonds, but the railroads attempted to do in a few years what should have been spread over 10 or 20 years, with the result of raising the rate of interest about ½ percent every year for the last three years. Instead, therefore, of railroads now borrowing on long term bonds at 3½ percent they must borrow on short term notes at 5 to 6 percent to complete the improvements for which they have contracted. The great demand for money and the large loans of the New York banks and trust companies is from the railroads to carry out the improvements for which they have contracted. Every banker in Chicago, as well as New York, will tell you today that the railroads are their great customers for borrowing accommodation.

"I hope we have turned the corner and are again on the down track in the money rate for railroads, but the serious feature of the situation is that the railroads have crowded the industries which support them very sharply in the money market and in many cases run them off the money track in order to complete the contracted railroad improvements. There is today no money in this country for new enterprises and the railroads will have to slow down their improvements, make no new contracts, retire their floating debts and short term notes, and give industries a better show at the money market before we can figure on the next great period of business improvement."

We have called attention now and again to some of the results of the Wall Street regime in the iron industry—things that were not dreamed of in the days when iron and steel manufacturers pushed their business on the homely, old-fashioned plan of making their money out of what their mills and furnaces

produced. As an eloquent example of the more modern method we append two extracts from the latest iron market bulletins of Wall Street:

"Evidences are multiplying that the steel and iron business is to shake off its lethargy. The Chicago district reports an unusual demand for wire, tin plate and other similar products."

"Orders are now being placed for delivery of material well into the future, which is quite a change from conditions recently prevailing when consumers only ordered for immediate needs."

We are told that it is the habit of Wall Street to "anticipate" the actual developments in agriculture, finance and manufacture. Evidently the habit of seeing things as they are to be, or as it is hoped they are to be, has twisted the Wall Street vision of current events in iron and steel.

Reported Sale of the Allis-Chalmers Co.

Newspapers in New York and Chicago published the statement last Friday that the General Electric Co. had bought the Allis-Chalmers Co. and was negotiating for the purchase of the National Electric Co. of Milwaukee. It is impossible to confirm the report, as none of the officers of the interested companies will make a statement. The Allis-Chalmers Co. was incorporated under the laws of New Jersey on May 7, 1901, as a consolidation of the property and business of the following builders of heavy machinery: Edward P. Allis Co., Milwaukee; Fraser & Chalmers, Inc., Chicago; Gates Iron Works, Chicago, and the Dickson Mfg. Co., Scranton, Pa.

(Special Telegram.)

NEW YORK, July 13.—An official of the General Electric Co. says that the report that the company has acquired the Allis-Chalmers Co. is absolutely without foundation. At the offices of the Allis-Chalmers Co. similar assurance was given.

Cincinnati Pipe Contract.

The United States Cast Iron Pipe & Foundry Co. has taken the contract for 14,200 tons of cast iron pipe for the city of Cincinnati, the sizes ranging from 4 inches to 48 inches. Most of this pipe will be made at the Addyston plant of the company and deliveries begin at once. Specifications for the balance of the Cincinnati requirements are not yet out, but about 18,000 tons of pipe remains to be let.

East River Tunnel Castings.

(Special Telegram.)

NEW YORK, July 13.—The contractors for the East river section of the Pennsylvania tunnel announced at noon today that they expected to award the contracts for the 108,000 tons of castings before the day is over. The delay in the matter is in reference to the apportionment only. The contractors will not verify the report that the Davies & Thomas Co., of Catasauqua, Pa., has been given a contract for 50,000 tons, but it is believed the foundry at Catasauqua will get a portion of the award.

Officers of the Youngstown Foundry & Machine Co., Youngstown, O., which is a consolidation of the Youngstown Steel Casting Co. and the Youngstown Foundry & Machine Co. were elected this week as follows: Thomas Parrock, president; T. B. Van Alstine, vice president; Frank A. Williams, secretary and treasurer; and W. J. Wallis, general manager. The board of directors consists of the above named officers together with Milton E. Coombs, George Higley and George E. Rose. The company is capitalized at $250,000.

Provisional scales of the Amalgamated Association have already been signed by the following concerns: Brown & Co., Pittsburg; Licking Rolling Mill Co., Covington, Ky.; Highland Rolling Mill Co., Terre Haute, Ind.; Griffiths Charcoal Iron Mills, Washington and Waynesburg, Pa.; Eagle Horse Shoe Co., South Milwaukee; National Rolling Mill Co., Vincennes, Ind.; A. M. Byers Iron Co., Pittsburg; Lockhart Iron & Steel Co., Pittsburg; Helmbacker Forge & Iron Co., St. Louis; The Empire Rolling Mill Co., Cleveland; Ohio Falls Iron Co., New Albany, Ind.; Railway Spring Co., Detroit; Cleveland Hardware Co., Cleveland; Kansas City Bolt & Nut Co., Kansas City; Fort Wayne Iron & Steel Co., Fort Wayne; Empire Iron & Steel Co., Niles, O.; N. & G. Taylor Co., Cumberland, Md.; The Tyler Tube & Pipe Co., Washington, Pa.

Corrosion of a Steel Stack.

W. A. Polk, of New York, writing to the *Engineering News* concerning a case reported in its columns, of the corrosion of the interior of a high stack through which acid and ammonia fumes passed, says: "I have inquired into this matter and learn the probable reason for the stack corroding at the middle of its height is due to the fact that that is the point at which the gases condense and settle on the steel. Up to that point the acids and ammonia have been in a gaseous state, and when they condense they settle on the steel and affect it very much more at that point than they do further up the stack. Wrought iron would last very much longer than steel in a stack of this kind. A paint made of graphite as a base, with a vehicle especially manufactured to meet the conditions, would probably be the best protection possible. Even this would not be a permanent protection. Two or three coats of the paint should be applied, allowing ample time for each coat to dry."

The Helen mine of the Lake Superior Corporation, resumed shipments of iron ore last week and it was expected 12,000 tons would be moved in the first week.

The American Pig Iron Storage Warrant Co. had in yard on July 678,900 tons, the amount put in yard and the amount withdrawn in the preceding week being the same—2,400 tons.

George A. Dickson, Empire Building, has been appointed Pittsburg representative of the Susquehanna Iron & Steel Co., manufacturers of pipe and tubing. Last week he was awarded a contract for 28 miles of line pipe for a Western Pennsylvania consumer, ranging in sizes up to six inches.

The plant of the Youngstown Iron Sheet & Tube Co., Youngstown, O., resumed operations this week after a brief idleness. While the Amaglmated Association scale has not yet been signed by this company, the officials agree to abide bv its terms when a settlement is reached.

All of the plants of the National Tube Co. located at McKeesport, Pa., which were shut down the first of this month resumed operations this week. The Demmler plant of the American Sheet & Tin Plate Co. at that place also resumed operations.

The resignation of Charles M. Schwab as a member of the board of directors of the American Steel Foundries Co. was announced by President Charles Miller this week. Mr. Schwab's interest was purchased by Mr. Miller and George B. Leighton.

The loading of ore on vessels at the Duluth, Missabe & Northern docks at Duluth was stopped for a few hours July 12 by a strike of laborers, who demanded an increase in wages of 25 cents per day. The strike was ended when the company granted an additional 10 cents. The Great Northern and Iron Range roads granted the same advance.

In the suit of Frank Donner against his brother William H. Donner, to recover alleged profits from the promotion and sale of the Union Steel Co. of Pittsburg to the United States Steel Corporation it was shown in court that the profits of the promoters amounted to $7,300,000 of which W. H. Donner received one-fourth. Frank Donner sued for a share of the profits alleging that his brother was to have purchased $25,000 worth of stock for him. Judge Marshall Brown of the common pleas court sustained the claim of Frank Donner for a share in the profits, the court granting him 4-55 of his brother's profits. The case will probably be appealed.

The Labor Situation.

AGREEMENT WITH YOUNGSTOWN MOLDERS.

The molders and foundrymen in the Youngstown, O., district, after several conferences, reached an agreement last week, which carries a reduction in the existing scale of wages and which is as follows:

1. That any disputes or difficulties arising between the parties hereto during the term of this agreement shall be settled strictly in accordance with the New York agreement.
2. Beginning July 15, the minimum rate of wages per day of nine (9) hours, during the term of this contract, shall be $2.85 per day for the journeymen molders and $2.65 per day for journeymen coremakers.
3. That nine (9) hours shall constitute a day's work. All time worked over nine (9) hours in any one day shall be considered overtime.
4. Time and half time shall be paid for all overtime, and double time shall be paid on Sundays, Fourth of July, Labor Day, Thanksgiving and Christmas.
5. It shall be optional with the individual foundrymen whether the shops shall be operated on the give and take system, or by the full number of hours, provided that the give and take system shall be limited to 30 minutes on either side.
6. It is agreed that no restrictions shall be placed on the output of the molders in any of the foundries involved in this agreement, and that all individual castings or number of castings from one pattern or patterns heretofore produced in one day or multiple of one day, shall be made in at least the same time.
7. The parties hereto pledge their best efforts to carry out this agreement in good faith, with the understanding that during its life the iron molders of Youngstown shall make no further demands upon the foundrymen.
8. That it is hereby mutually agreed and understood that in case of any arrangement being made by the officers of the International Iron Molders' Union of North America, and the National Founders' Association, having any reference to the question of differentials, or any other subject now under consideration by the officers of either association, it shall be made a part of this agreement, and that all parties hereto shall be bound by any national agreement that may be made or entered into between the representatives of both associations at any time during the life of this agreement.
9. This agreement shall continue in force until June 30, 1905, and unless thirty (30) days previous thereto notice of a desire to change any of the conditions of this agreement be given by either party hereto, then this agreement to continue and be in force until June 30 next following.

AMERICAN STEEL HOOP CO. AND THE WAGE SCALE.

The plants of the Carnegie Steel Co., Youngstown, O., formerly operated by the American Steel Hoop Co., continue idle, and as yet no effort has been made to hold a conference with the officials of the Amalgamated Association for agreeing upon a new scale. The company demands an entire revision of the existing scale, which the association does not desire to grant. The Carnegie Steel Co. is willing to treat with its employes individually, according to reports, but the new scale it offers carries important reductions from last year's scale. As yet no effort has been made to operate the plants, and it is probable that none will be made unless it is found impossible to secure proper concessions from the Amalgamated Association.

REDUCTION TO PITTSBURG MOLDERS.

On Friday, July 15, the wages of molders employed in the shops of the Pittsburg district will be reduced as announced some time ago. No agreement could be reached with the molders and as no further conferences have been arranged for, the cut will go into effect as first contemplated. The molders have not yet signified what course they will pursue, but it is believed that a strike will be declared. Whether the machinists will strike cannot be learned, as they will also receive a cut.

IS LIMITATION OF APPRENTICES LEGAL?

The recent decision of the appellate court of Cook county, Ill., in the Kellogg Switchboard & Supply Co. case, holding that the closed shop is illegal and renders both parties to an agreement to employ only union men liable to criminal prosecution, is commented on in the last issue of the *Review* of the National Founders' Association. Its application to the limitation of apprentices is thus referred to:

"If it is unlawful for one to agree to limit his employes to members of a certain organization, why is it not equally unlawful for one to agree to restrict the employment of a certain class of labor? Likewise to restrict the amount of labor a man may do in a specified period. Since its adoption in 1859 the creed of the Iron Molders' Union has upheld and insisted upon restricting the number of apprentices to a certain ratio. Wherever by threat of 'impending calamity' in the form of strike and its attendant carnage this union could force the recognition of this ratio of apprentices, it has done so, and while the National Founders' Association as an organization has absolutely refused to recognize the justice or equity of this restriction foundrymen have been known to enter into agreements containing such a provision.

"In the light of the recent decision of a competent judicial tribunal, we are confronted with a possible illegality of such agreements. The national officers of the Iron Molders' Union have given frequent expression of their antipathy to the policy of limiting the output, but so far have succeeded in evading requests that they sign a national agreement having such scope, and in turn have pressed recognition, by a national written agreement, of the apprentice limitation."

"For years the officers of this union have insisted upon the provisions of their constitution limiting the ratio of apprentices being recognized, and have said it was not within their power to alter this "organic law." They have for a long time advanced the theory of educating their members to the point of remedying this evil by constitutional amendment. In this their efforts seem to have been crowned with signal failure and undoubtedly the time has now arrived when the members of the National Founders' Association should convey to the Iron Molders' Union the information that the well-known contention of the former as to the injustice and inequity of an apprentice limitation has become indelibly established by judicial decision, that these contentions are well within the law and there they must remain.

"What is true of the limitation of apprentices is true also of limitation of output, in so far as the broad ground of public policy and all contracts in restrain of trade are concerned."

NATIONAL METAL TRADES ASSOCIATION.

CINCINNATI, July 12.—The strike at the Leschen & Sons Rope Co., St. Louis, has been declared off. About 50 percent of the strikers have been re-employed. The balance of the force is composed of new men.

The F. Messmer Co., of St. Louis, against which the Brass Molders' Union has been discriminating for the past five or six months, is now and has been for some time running with a larger force than in ordinary times. Business with them appears to be good, and the inconvenience that was at first experienced when the union molders struck has entirely disappeared.

Concerning the strike among the boilermakers and iron shipbuilders in New York, advices are to the effect that the men on strike have practically given up the fight as a lost cause. Pickets have been removed from the employment bureau and there is little or no trouble at the shops. Four men were prosecuted for assaults committed a week ago. Judge Correll discharged one after a trial on the charge of assault, because of lack of evidence. Judge Moore in Jersey City, for the same reason discharged another charged with assault.

The monthly meeting of the New York Metal Trades Association, will be held Thursday afternoon, July 14. In addition to the usual routine business a number of subjects of interest to the members will be discussed.

Jack Gallaghar, who assaulted Attorney A. C. Allen in Chicago, has been indicted. Mr. Allen has taken a turn for the better and his life is no longer despaired of. Evidence will be presented to the grand jury this week on which indictments will be sought against various officials of the machinists' union for complicity with Gallaghar in the Allen assault, the evidence showing conspiracy on the part of these leaders to injure or murder attorneys who took injunction cases, as well as secretaries and other officials of employers' associations. The shops in Chicago are now nearly filled. The national association sent over 500 men to its members in Chicago. Only a few jobs for selected men remain open. Several thousand copies of Judge Adams' decision making the

closed shop a criminal conspiracy have been distributed to employes as a result of the efforts of the N. M. T. A. and Anti-Boycott Associations.

Commissioner Eagan will arrive in Cincinnati Tuesday, July 12, to take charge of the association office. Since July the commissioner has been kept busy on the road looking after matters at various points. Secretary Wuest will probably return from Chicago this week. Mr. DuBrul has been taking care of the important matters pertaining to the commissioner's office until Mr. Eagan's arrival. Mr. DuBrul is preparing to take up at once the matter of forming a company for the development of a cement enterprise in Jackson county, O.

N. F. A. AND MOLDERS DRIFTING APART.

It has been apparent for some time, and more marked since the futile effort of conferees at Detroit to get a national agreement between the two organizations, that the National Founders' Association and the Iron Molders' Union have been drifting steadily farther apart. A recent official communication to the members of the National Founders' Association makes this statement concerning the situation:

"The membership of the National Founders' Association has proven itself 'true blue' thus far in its treatment of agreements with molders. Prior to the holding of the national conference in April members of the association whose agreements with the molders were about to expire or had expired, were requested to await action of this conference before executing new contracts. In adhering to this plan our members have exhibited a loyalty which cannot be too highly commended. After the adjournment of this national conference, and the failure to secure a uniform agreement the decision was reached by the officers of the association to adopt as a definite policy the equitable principles which should obtain in the foundry of every member of the association and in furtherance of this plan all members are now giving or have given notice of an unwillingness to continue the local agreements of last year. In no case, as far as we are aware, has one of these agreements been renewed.

"The general trend of opinion seems to signify a firm belief in the superior advantages of proceeding without an agreement rather than give new life and vigor to the obnoxious conditions established under agreements of the past few years. And here lies the key to the whole situation. The system of local agreements with molders is really of comparatively recent origin. Before the year 1899, in which the New York agreement was made, local agreements were almost unknown. In that year a few were signed. As the boom of prosperity gathered velocity and weight the union seized the opportunity to compel additional recognition. Many foundrymen actually view with each other to be first in granting this recognition and the system of local agreements became 'crowned with the cross of gold.' Once established but little remained to be done by the national officers of the molders' union to afford added zest to local proteges in efforts to hold the vantage point. With each revolution, like a snow-ball, the movement gathered in volume.

"The National Founders' Association, then only in a formative state, was called upon to meet the accrued benefits of a labor organization already in the 31st year of its existence. The members of this union were mostly possessed of the spirit of Anglo-Saxon enterprise, and for over a quarter of a century had not been met by any obstruction in their path of perfecting their complete and unsurpassed organization. Little wonder is it that when the National Founders' Association appeared on the scene, with officers and members in a new role and commercial affairs in a plethoric state, it was hardly possible to promptly check the course of this practice. There were many foundrymen at that time who possessed a firm belief in the efficacy of local agreements. Others were forced to sign them. All are now the wiser for the experience and united in opinion. Simultaneously all seem to have reached the conclusion that the present is the opportune time to curb the onslaught. No one is entering into these compacts now, but for the future the way must be cleared.

"During the present period of temporary depression let us not neglect the opportunity to study the possibilities of a revival of business and increased requirements of our customers.

"'In times of peace prepare for war.'

"Let this sound the warning to members of the National Founders' Association not to sleep on their right, but to stand firmly at the helm that the officers of their association may have the fullest measure of support in their detetrmination not to permit the rejuvenation of this system of local agreements once it is removed from the catalogue of things extant.

"'Equity aids the vigilant.'"

SHEET SCALE NOT ADJUSTED.

(Special Telegram.)

PITTSBURG, July 13.—President J. A. Campbell, of the Youngstown Iron, Sheet & Tube Co., denies that he said the Amalgamated scale would be signed as soon as presented. He says no sheet scale has yet been presented and that the differences between the independent sheet manufacturers and the Amalgamated Association are not adjusted.

BAR IRON SCALE ADJUSTMENT.

(Special Telegram.)

PITTSBURG, July 13.—The bi-monthly wage settlement of puddlers and finishers was had at the office of the Republic Iron & Steel Co. this afternoon and resulted in the continuation of the same wages for July and August as were paid in the last two months. The average selling price of bar iron was 1.3c, which gives puddlers $5.25 a ton.

The iron scale for the present scale year is not yet adjusted and no date is fixed for holding further conference. Scale wages will be paid until the new scale is agreed on, when new scale prices will apply from the beginning of the present month. Owing to the low prices at which bar iron has been selling the past month it is generally believed that the average will be below 1.3c.

LABOR NOTES.

The New York agreement, which has long existed between the members of the National Founders' Association and the Iron Molders' Union, is now no longer in effect in Indianapolis., Ind., Worcester, Mass., St. Paul, Minneapolis, St. Louis and Pittsburg. National conferences having been held in all these cities on pending wage matters, but no understanding was reached. In accordance with the policy adopted by the National Founders' Association some time ago, its members terminate all relations with molders' union in every city in which a national conference has been held without result.

At the convention of the western division of the International Association of Machinists, recently held at Denver, it was voted to assess each member $1.00 a month, which will amount to $25,000 monthly, to assist the striking Santa Fe railroad machinists.

The Fort Wayne Iron & Steel Co., Fort Wayne, Ind., has signed the Amalgamated scale of wages for another year. The company has been threatened with a strike and had been negotiating with its men for several days.

The strike of the union machinists on the Chicago, Lake Shore & Eastern Illinois and the Joliet, Elgin & Eastern railroads has been settled. The strike was called some time ago on account of the companies refusing to grant an increase in wages.

Fred Matson, attorney, and secretary of the Indianapolis Employers' Association, having fought unionist attacks upon non-union workers and secured nineteen convictions on as many arrests, was warned the other day of personal peril. A letter posted at Anderson, Ind., enclosed an account of the recent attack upon A. C. Allen, in Chicago. "You are next," was written on the newspaper clipping sent to Mr. Matson.

The Ohio Falls Iron Co., New Albany, Ind., has signed the wage scale with the Amalgamated Association for the year commencing July 1.

Two hundred men are on strike at the stripping work of the Drake & Stratton Co. on the Stevenson mine, near Hibbing, Minn. One hundred men employed in the mine are also out. The strippers were receiving $1.60 a day, and the miners $1.80. Higher wages are demanded. Workmen have been obtained to take the place of the strikers and are at work under strong guard.

A reduction of 5 percent has been made in the wages of the

employes of the Betts Machine Co., Wilmington, Del. The reduction was accepted by the men without protest.

The Forest City Steel & Iron Co., Cleveland, which has the contract for the structural iron work on the Rockefeller building in that city and has had differences with the unions regarding the employment of non-union labor, has sublet the contract for the work to the Thompson & Starrett Co., of Chicago, which has the contract for the brick, mason and ornamental work on the new building, and no further labor trouble is expected.

James McMahon has been appointed general organizer of the American Federation of Labor by Samuel Gompers, the national president. Mr. McMahon will perform his new duties in connection with those of national president of the Blast Furnace Workers' Association.

The Poetry of the Automobile.

The New York *Journal* credits Maurice Maeterlinck with the following vivid description of the mechanism of an automobile. It is an interesting illustration of the mingling of poetry and hysteria that is often found in "literary" attempts at things mechanical:

"The engineer laid bare its heart to me; I know the secrets of its circulation, its very soul. That soul consists of the electric spark, taking fiery breath seven or eight hundred times per minute. As to the heart, it is a terribly complicated organ, intended to mix fluids, prepare and turn them into gas. Wedded to air the gas begets power—a power that has existed since the beginning of the world. This awful mixture of air and gas is forced through the entrails of the monster, lying close to the generator. There we have the chamber of explosions, the piston, the valves, the igniter—in short, the power organs of the motor, its life. Clean, watchful waters constantly circulate about the intestines, forming a fiery rock, as it were; except for the soothing influence of the surrounding fluid, they might turn into a bed of hot lava. Indeed, the generator would burn out with incessant work were it not for the cooling draught that retards the fever.

"Further, my engine of flight is furnished with an interrupter regulating the electric spark, and, on its own part, regulated by the auto's motion. Thus the soul of an auto obeys literally the directions of its body, while the latter bows gracefully to the dictates of the vital principle. But, thanks to the curious elasticity of the harmony between powers, a superior will is able to still more heighten the marvelous capacity of the machine, the will of the chauffeur, who plays off one against the other, according to the conditions of the road.

"Most heavily weighing on the cares of the chauffeur are the interrupter and the igniter—curious appellations, born of the moment to introduce apparatus to the world of which, but yesterday, it did not even dream. Who created the names? No one in particular. They emanate from factories and artisan shops, and mean just what they say. By the time scientists are interested, threatening investigation and change, it is usually too late. The name is there to stay and it is better so.

"Interrupter and igniter gave me a lot of trouble at the start, and there are seven or eight smaller cares; such as compression, generation, water circulation and accumulators. And the oil can. If the position of the interrupter wavers but a hair's breadth or if a tiny drop of oil or a bit of rust interferes with the current, my beautiful marvel-horse is suddenly dead. And instant death may ensue, likewise, by obstruction of a dozen other curious organs—I shudder to think of them all. At the bottom, for instance, like an evil spirit immured in a cell much too small for him, lies the strange speed-machinery that, at the foot of a hill or mountain, obedient to the action of a simple lever, indulges in explosions without number.

"Instantly the piston begins to work whirlwind fashion; every fibre of the monster trembles, while the wheels, about to stop, suddenly gather four times latent power, a power that compels mountains to bend their backs, allowing the conqueror-machine to gain the top in triumph.

"There is also the Cardan shaft, a curious construction, which takes the place of chains, toothed wheels, leather belts, etc. Witness how it transfers the mad beats of the whirling heart upon the rear wheels. And still lower, underneath the brake, the transcendental mystery of the differential organism —a new world's wonder! We see two wheels of equal diameter, turning about the same shaft and moved by the same motor, yet each describing an individual number of revolutions."

PROTECTION FOR BRITISH IRON AND STEEL.

The members of the iron trade as a whole, whether they are with Mr. Chamberlain or whether they are against him, must be greatly concerned in the appointment and in the work of his tariff commission. That commission may be regarded as unnecessary, as too previous, as beating the air, or in any other point of view; but, consisting, as it does, of some 58 gentlemen of experience, knowledge, and good repute, it cannot fail to command respect. Nor can it be doubted that it means business. We should be surprised if, within the next few months, it should not succeed in framing a model tariff more or less suited to the exigencies and conditions of every one of the great manufacturing industries of the British Isles. That tariff, indeed, may never be called for; the electorate may decide against any change in our existing fiscal policy, and the commission may have its labor for its pains. This, however, is unlikely. It seldom happens that a public movement, affecting every class of the community, and approved by many, is started and carried on as this has been without involving change of some kind. That change may only go the length of enabling the Government, in certain events, to pursue a course of retaliation; or it may stop at the liberty to negotiate tariff duties with foreign countries on a certain limited margin, which even the Duke of Devonshire approves. But, whatever its ultimate form may be, any change is likely to call for a system of tariff duties, under which, in certain events, British manufacturers would have to operate. Let us, at any rate, assume that this may be the case, and proceed to inquire into the arrangement of duties best suited to the existing conditions of the iron trade.

The principles on which tariff duties are usually framed are various; but, speaking generally, they involve a lower system of duties on raw, semi-raw, or kindred materials, and a higher scale of duties in respect of highly finished materials. There is no reason to believe that this principle will be departed from in the process of framing a model tariff for the iron trade. Hence the duty on pig iron would be very low—perhaps nil; that on semi-products would be higher; and that on such finished products as rails, plates, wire rods, hoops, sheets, tires, and axles would be higher still. Mr. Chamberlain has more than once suggested that the duties levied under the proposed tariff should not average more than 10 percent *ad val.* This does not necessarily mean that in the case of iron and steel products the average may not be exceeded. We take it that the 10 percent is intended to apply to all manufacturers, those that are specially subject to foreign competition, and those that are not. The iron trade has been found to be peculiarly liable to the risk of dumping, and hence it is fair to assume that if any industry is to have a higher range of duties than another it should be that of iron and steel. It will be answered that this plea is likely to be advanced by most other industries. Perhaps so. In that event the commission would, of course, have to consider the special conditions of each, and provide for them according to their needs and their relative magnitude.

For our own part, we do not think that if any duties are to be levied at all pig iron should be regarded as exempt from the need for consideration. No doubt the special liability to dumping will form a prominent feature in any ultimate determination, and pig iron is certainly entitled to a 10 percent protection, if that view is to prevail, seeing that the United States, Belgium, Germany, Sweden, and even Canada send pig iron into British markets. On semi-products a higher range of duties is likely to be expected by home manufacturers, and no doubt the vast growth in the imports of this class of product will suggest a higher scale of duties than that provided for pig iron. On the other hand, it is quite probable that some British manufacturers of finished materials, who profit by the importation of foreign steel, may raise strong, and more or less cogent, objections to any duties at all in this line. This is a matter that has yet to be threshed out, and about which there is likely to be a certain amount of difficulty, owing to conflict of interests. To be of any avail tariff duties on rails, plates, wire, tubes, and kindred products would have to be fixed at a higher figure than 10 percent, a figure, by the way, much under the average duties of competitive protectionist countries.—[London Iron and Coal Trades Review.

TUBE MANUFACTURE IN ENGLAND.

Marshall Halstead, United States consul at Birmingham, Eng., has sent two interesting communications to the Department of Commerce and Labor recently. Both have to do with the manufacture of tubes in Great Britain—one to welded tubes and the other to drawn tubes. One is devoted largely to a phase of the labor question and refers to the experience of American workingmen who accepted positions in a mill near Birmingham—a reversal of the common movement of labor as between the United States and Europe. While Mr. Halstead does not write as an expert—few consuls do—and while some portions of the explanation he enters into are non-technical and others elementary, his letters are interesting and we reproduce them both, with their original titles:

The Americanization of British Manufactures.

My interest in tube manufacture was aroused originally by the fact that weldless or seamless cold-drawn tubes, made with exceeding care to meet certain high-grade requirements, were, and still are, shipped to the United States from my consular district. This interest increased when I learned of the engagement and importation by one great British tube company with works near Birmingham of four American workmen, to go on night and day shifts of two each, to take charge of a lap (tube) welding plant built on the "American plan." Besides, when I was in the United States last June I read in the newspapers that this American competition with America had been followed—the newspapers announced that the men were starting for England—by the engagement of four American butt welders for work with another British tube company in a town near Birmingham, also in my consular district, and, strangely, this missionary trip of American workmen seemed to be regarded as a matter for congratulation upon our part.

There are many ways of making tubes for steam, gas, water, etc., which may practically be divided into two classes, viz., tubes from blooms and tubes from strip. In the first class, tubes are made direct from iron or steel blooms by first drilling the blooms or by using hydraulic power to pierce them, the metal (heated) of the pierced or drilled bloom being then forced or rolled forward over a bar mandril into tube; or a bloom is cold drawn—step by step, with corresponding intermediate annealings—through a bell mold and over a ball mandril. These cold-drawn weldless or seamless tubes are of the kind I refer to above as being shipped to the United States. There is also a spinning method—in fact, several of them—mandril or bloom or mandril and bloom spinning, while the bloom is being pierced the displaced metal being spun over a bar mandril into tube. It is asserted as an argument against the spinning method that it tears the fibers of the metals, and I am told that tubes made in this way are not accepted by the British Admiralty for boiler tubes.

Seamless or weldless tubes are unquestionably the ideal tubes, and would have come into universal use but for the cost. Tubes of the second class are made from strip. Metal is rolled into strips of the thickness or gauge and the length, generally 20 feet, of the tube desired, and of a width—in lap welding the scarfing or the beveling of the edges being calculated upon—which, when the strip is rolled up and the edges are welded will give the tube the diameter required. The weldings are of two kinds: For butt welding the strip, when at welding heat, is rounded, and the edges are brought together butt to butt and welded into a tube. In lap welding a strip having its edges scarfed is heated to a welding heat and rounded and the scarfed edges are brought together to lap, and thus welded. Lap and butt welding are fundamentally awkward processes, and were, perhaps, the original methods of welding tubes, and while lap welding produces a higher grade of tube than butt welding (and there has been very great perfection obtained in the former), tubes welded from strip are really substitutes for better articles.

There has, however, been constant progress in the manufacture of lap and butt welded tubes, increase of speed in making them, and very great advancement toward perfection in results, and that these improvements have been largely American is made evident by the fact that not only are new butt and lap welding plants in Great Britain built in imitation of or on American lines, but as I stated in my introductory paragraph, in one great British tube factory in this district there are four American workmen (two shifts) in charge of the lap-welding plant, and in another tube factory four Americans (two shifts) in charge of the butt-welding plant.

These men were brought here from Pittsburg and adjoining tube-making neighborhoods, the lap welders under five and three year contracts, the butt welders under three and one year contracts, at wages many times greater than the ordinary rate of wages in this district, and, as an inducement to the men to come here, at an advance—not a big one—over American lap and butt welding wages.

Of course the inherent spirit of adventure and the idea so generally held in America, and as generally erroneous, that living is much cheaper in England than in America, influenced these men to come here. There were some disappointments in store for them, but they are fairly happy and content now, though without doubt they are the only workmen in this neighborhood who pay a good big income tax, and of course an income tax was not in their calculation as an offset to their earnings here. They have told me that they can not live as cheaply here as they could at home; certainly, food is dearer; and clothing even, all articles of wearing apparel for a family considered, they think not as cheap as at home. I really should print some letters I have had from them on the subject. Near one of the works the men were not able to find at any price houses with the conveniences they were accustomed to and had thought necessary to their comfort when at home, because there had not been anticipation that men in their position would have an ambition to or could afford to occupy the kind of houses they had thought they required; and they could not go into a better neighborhood—that is, the middle-class neighborhood they could afford to live in—because, working before hot furnaces, they must get indoors, for a time at least, as soon as possible after they had finished their work. The company very kindly complied with one of their requirements—somewhat unusual here—by providing them with a convenient place at the works for changes of clothing.

In the case of one of the plants for lap welding, while it was supposed to have been built on American lines, the furnaces were not satisfactory, the brick linings being a few inches instead of many inches thick (my consulate records show that Staffordshire fire brick was formerly shipped to the United States), and the sand for the bottom of the furnace was not satisfactory because, taken from the mouth of a river, it contained dirt, while there was need for a pure sand; and the plant was too close to other machinery. Most of these difficulties have been adjusted to their liking. They secured at last a pure sand, and a better brick is used, so that the furnaces are not down as often as originally and they can now make their bonus for output regularly; and I think I am correct in saying they have tripled any English coal furnace output with one furnace and same number of men—though it is not as great as they might wish, for recently they have produced more than the company can sell, and they have long lay-offs. The butt welders in the other works found in the new machinery that the American plan had been reversed, so that tubes started fast and then went slower, and therefore did not clear, so by an arrangement with the management, the company's draftsman having been placed at their disposal, they have had to rebuild the plant so that the butt welding can start slow and finish fast. As I have not seen any of them since they completed the rebuilding and had the new plant under way, I have not heard what success they have had.

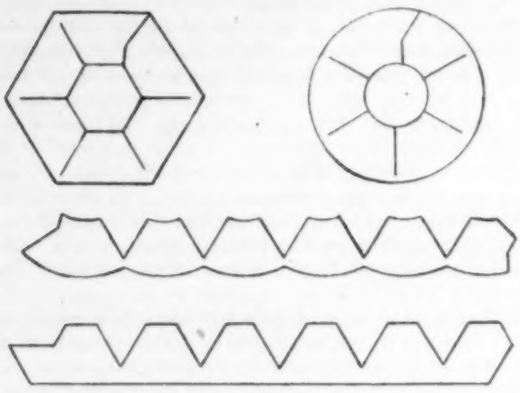
Hollow-Bloom Tube Making in England.

When I heard some time ago that a hollow bloom for tube making was being rolled in the neighborhood I was glad of the opportunity of seeing the process, and accepted the invitation of Mr. George Inshaw, the English inventor, and Mr. Hugh McDonald, an American, of St. Paul building, New York, who had secured the option on the patents for the United States and Canada, to go out into the Black Country and see the process in actual operation.

I saw the rolling of several hollow iron blooms; saw several of these blooms welded and one of them made into pipe. The inventor's object was to produce a seamless iron or steel tube for steam, gas, or water, and all other services, and other hollow articles such as shafting, all to be of a better

quality and produced at less cost than when made from strip, of a better quality than when spun over a mandril, equal to any tubes made from a pierced or bored bloom, and perhaps, owing to the amount of work the metal received in the rolling, of as good a quality as when cold drawn.

Puddled iron balls were first formed into slabs by means of a steam hammer, and these slabs were then rolled into blocks or bars, with longitudinal segmental projections connected with a thin backing or plate of metal, a cross section of which is shown in the accompanying cut, as are cross sections



of the two kinds of hollow blooms, which may be formed by the rolling of either of the two forms of segmental projections on on the bars. In one kind the interior of the bloom is round and the outside somewhat hexagonal, in the other the interior is hexagonal and the outside of the bloom round, the latter type being made when I was present. The plates or bars, without reheating, were rolled or formed by being passed through a skelping machine, which bent the thin backing or belt of metal, bringing the longitudinal segmental projections together, thus forming long hollow blooms. These long hollow blooms are sawed into required lengths, and, while still retaining much heat which is not exhausted in the first process—the interior of such a roll naturally retaining heat—are put into a furnace and the heat is raised to a welding point; then they are passed through welding rolls, and, without further heating, made into tubes. The advantage in welded rolled blooms over built-up hollow blooms, made by the other process which I have referred to above, would seem to be in the fact that there is less surface for oxidation, and, contrary to the prediction of experts regarding the Inshaw bloom, the angles of the rolls when pressed together seem to push out any oxidized particles into the hollow of the bloom when the inside hexagonal type is used, and outside and away from the bloom when the outside hexagonal type is made.

To prove his claim that the steel or iron skelped piece or bloom, being welded in a thick body, is a perfect and seamless hollow bloom, and that when it is reduced to the thickness of the wall of a tube the tube so produced will stand a "pressure equal to a tube produced from a drilled bloom, or nearly four times more than tube made from steel or iron strip," the inventor offers the following report of tests which Messrs. Tangey, Ltd., a great engineering firm of Birmingham, made on "four pieces of tube sent them." It reads as follows:

No. 1. Hickman's common steel burst at 6,720 pounds per square inch.

No. 2. Hickman's common steel stood a dead pressure of 5,600 pounds per square inch.

No. 3. Lillieshall Co.'s common puddled iron burst at 6,272 pounds per square inch.

No. 4. Lillieshall Co.'s common puddled iron stood a dead pressure of 4,480 pounds per square inch.

Mr. Inshaw claims that in welding the blooms in a thick body there is much less scale waste than when making tube from strip, because in the making of strip—often there are two outside layers of good material and a center layer of "muck"—the whole surface is raised to welding heat and then exposed to the atmosphere before being put into the welding furnace. He claims that the strip tube makers begin with a highly finished material, while he produces a finished tube in less time and with fewer heating operations than are necessary to make strip itself, and he can produce tubes of any required thickness of wall for hydraulic and other purposes where safety is a great factor; that not only does his process apply to tubes but to hollow shafting, hexagon and other nuts, hollow axles, collars, bridge and shipbuilders' ironwork, guns, projectiles, electrical trolley poles and conduits, and every other description of tubular or hollow engineering work. The general manager of one of the great iron works in the Black Country, in a testimonial he gives, expresses the opinion that the blooms can be made at from 40 to 45 shillings ($9.73 to $10.94) less than the price of strip, and that better and stronger tubes are obtained from these hollow blooms, and that whatever waste there is takes place with a less costly material. In his comparison of the processes he states that in the strip process there is loss in weight of ends when it is sheared for the mill, loss of labor and fuel when filing, heating and rolling in strips when it is cooled before the next stage (that of actual tube making) is reached, that 10 percent is lost as scrap ends when cutting ready for the tube maker, who must then heat it and make it into tubes, and that this process includes much scrap from the tube ends.

"Compared with Inshaw's process," he adds, "all this means loss of scrap off tube strip, extra loss on finishing tubes, fuel loss on reheating the puddled bar, fuel loss on converting the puddled bar into strip, extra loss of fuel in raising the cold strip to the temperature which Inshaw's process gives naturally. Then there are the wages of cutting down the puddled bar, the wages of heating, rolling, and cropping, with all conveyance charges, and all costs of millwork," while in the Inshaw process it is all accomplished in one heating and a wash heat and at a small labor cost.

On the other hand, one of the American strip-tube makers to whom I gave the points of the hollow-bloom method claimed that while he might begin with somewhat costly material, the rapidity, as compared with that of any of the processes from a bloom, with which he with helpers could turn out tubes (1,050 20-ft. 2-in. tubes in 10½ hours being his furnace record), would make his process still more economical. He, however, had not seen the hollow-tube process, and while expert in his own line and a very intelligent man, had not taken much interest, he admitted, in other methods of tube making.

Exporting Iron Ore.

For the first time in ten years the firm of Witherbee, Sherman & Co., New York, last month made shipments of iron ore to Europe. For the eleven montns ending with May, 1904, the entire export movement of ore from the United States was 78,736 tons, most of it going to Canadian furnaces, and in May only 2,076 tons was exported.

L. H. Washburn, general agent for Witherbee, Sherman & Co., said: "It is true that we are making what under the conditions are large shipments of iron ore to Germany and Scotland. We have already shipped 12,000 tons and have booked many thousand more. We have been unable to make these shipments in the past owing to the freight rates being prohibitive when we had to compete with the Swedish ore on the other side. In shipping our ore from Port Henry by canal we have a slight advantage when it is to be transported to the other side over shipments to domestic points, inasmuch as there is less delay in transferring the ore to steamships than to railroads. Thus far we have made all our shipments from this port; but we have the alternative of shipping by the way of Montreal, as we have an all-water route by canal to that point from our mines and the freight rates are the same. How long we shall continue this line of trade I cannot say, but at present negotiations are pending for further shipments. The feasibility of shipping iron ore abroad depends entirely on the attitude of the steamship companies and the freight rates."

The ore exported by the New York firm is high phosphorus lump magnetite and it is understood that the selling price was $1.30 at the mine.

The Dominion Iron & Steel Co., Sidney, has arranged to ship 100,000 tons from its mines at Belle Isle, Nova Scotia, to Germany. This ore is also high in phosphorus.

The Blakeslee Foundry & Forging Co., Cleveland, has been incorporated with a capital of $150,000. The incorporators are J. R. Blakeslee, F. L. Taft, T. W. Hill, J. R. Blakeslee Jr., and F. O. Brinker.

NOT A MACHINISTS' UNION SOUVENIR.

We are in receipt of a letter from the Coes Wrench Co., of Worcester, Mass., calling attention to what seems to be a systematic effort to impose upon machinery manufacturers in the name of the International Association of Machinists. On June 30 two men presented themselves at the office of the Coes Wrench Co. with the "dummy" of a souvenir which they said would be published by the International Association of Machinists. The scheme was to secure page advertisements from machinery and machine tool manufacturers, the pages to be illustrated with views of various plants and with group pictures of officers or office forces. The souvenir was to be bound in imitation leather and contain from 150 to 200 pages, magazine size, 6¾ x 9¾ inches. The Coes Wrench Co. refused to take space in the book, being suspicious that the enterprise was not genuine. As one of the canvassers rapidly turned the pages of the subscription book it was noted that the names of many concerns said to be subscribers were printed with a rubber stamp, and the type in each instance appeared to be the same. By the use of a telephone it was proved that one name on the list was placed there fraudulently, the firm inquired of replying that no order for space had been given. The Coes Wrench Co. then wrote to the Berlin Machine Works, of Beloit, Wis., calling the attention of the latter firm to the fact that in the front of the pamphlet shown at Worcester was a picture of the Berlin Machine Works office force, and the Beloit concern was represented as having taken a page of advertising. In reply to the question whether such an order had been given, the Berlin Machine Works wrote the Coes Wrench Co. that they had never contracted for an advertisement with the International Association of Machinists, nor had they been asked to do so. "It is hardly reasonable to presume," said this letter, "after the large amount of money which this association of machinists cost us through our strike last year, that we would contribute or lend our support either financially or morally to their upbuilding. We have no idea from your description, who the canvasser giving his name as Stone may be. We trust that if the company (another Worcester concern) were influenced in the least to place their contract with a canvasser misrepresenting the facts in regard to us, they will immediately cancel their contract."

On receipt of the letter from the Coes Wrench Co., which was sent to this office in order that machine tool manufacturers might be put on their guard, *The Iron Trade Review* wrote to the headquarters of the International Association of Machinists at Washington, asking whether a souvenir book was being issued in the interest of the association, and whether a canvasser had been authorized to solicit advertising from manufacturers. The following reply has been received from the office of the *Machinists' Monthly Journal:*

"Replying to your favor of the 7th, in which you ask if the International Association of Machinists have authorized any canvassers to solicit advertising for a souvenir, will say, no we have not, neither will we make any effort to solicit advertising of this nature ourselves or authorize any other parties; and if parties are using our association's name in this way it is nothing less than perpetrating a fraud and taking advantage of the parties buying the space.

"We would say, however, that there is a possibility that some of our district lodges or local lodges may do this (without it coming to our knowledge), for local reasons, and in which merchants and other business men lend their aid. In such cases the matter should be represented as the specific local or district of the International Association and over which we could not assert any authority in that direction.

"Our advertising agent is Mr. W. N. Gates, of Cleveland. We give him the exclusive rights over the ads in our *Journal*, beyond which we never trespass.

"Yours very truly,
"D. Douglas Wilson, Editor,
"Per Arthur E. Holder."

It would appear from the above letter that both the manufacturers approached and the International Association of Machinists have been imposed upon in connection with the souvenir scheme.

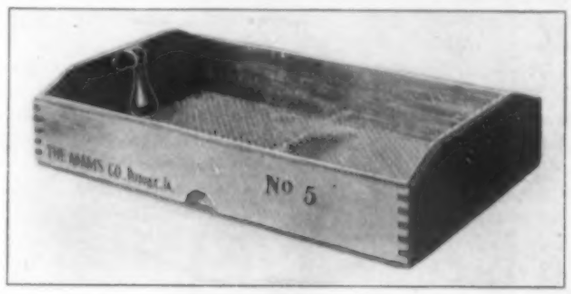
The Jones & Laughlin Steel Co. has added to its plant a style F Gates crusher from the Allis-Chalmers Co.

A NEW FOUNDRY RIDDLE.

A new riddle for molders' use has just been brought out by the Adams Co., of Dubuque, Ia. There were two objects in view: first, to riddle all or very nearly all the sand into the flask—not half on the floor—hence the shape is oblong; and second, to riddle the sand faster with less work. The latter end is gained by providing a small iron clapper on the inside of each end of the riddle in such a way that when the molder shakes the riddle back and forth, the clappers automatically vibrate or jar it. It is stated that the results are very favorable. The riddle is built for durability. The rapping of the clappers keeps the wire screen clean and the wire can be easily and quickly replaced when worn out. A raised rib in the center of the riddle serves to break up the large lumps of sand more quickly. The standard size is 11 x 18 inches, but other sizes can be made for special requirements.

Carbide of Silicon in Steel Manufacture.

An article in *Stahl und Eisen* says: Proposed for the first time in 1893, then studied in 1895 by John Darby, and afterwards by Fritz Lurmann and Captain Hunt, the employment of carbide of silicon or carborundum in the manufacture of steel has spread of late years in various directions. It is soluble in cast iron or steel and dissolves in acids at 360° C. Its analysis gives: silicon, 62 percent; carbon, 35 percent, of which 28 percent is combined and 7 percent free; iron, 1.5 percent; aluminum, 1.5 percent, and sometimes more; with traces of calcium and magnesium. It ought to be absolutely free from phosphorus and sulphur. Its employment is designed to prevent the formation of air holes, while avoiding gaseous disengagements. The oxygen in the melted steel, either dissolved or combined, reacts on the carbon, giving solid silica, which itself is combined with oxides of iron or manganese, forming a slag floating on the top. Another part of the silicon combining increases the dissolving power of the bath for carbon oxide, carbonic acid and steam.



A NEW FOUNDRY RIDDLE.

Practically in the Martin process for casting steel, with, for example, 0.02 percent of silicon and 0.10 percent of carbon, the needed quantity of silicon is introduced in the form of briquettes or large pieces. A bubbling occurs, which ceases as soon as the receptacle is full; then the casting becomes tranquil. The silicium carbide is advantageously added at the moment when no action may occur to cause gaseous disengagement, and also to raise the temperature and consequently increase the fluidity of the bath. It is an endothermic compound, which at the time of its formation at the high temperatures of the electric furnace, has stored a considerable quantity of latent heat. The price per kilogram of silicon carbide is 3.75 francs. F. Lurmann, on comparison with ferrosilicon, calculates that to have it economically equivalent the carbide ought not to cost more than 0.47 franc.

By arrangement with the electrical engineers, Brown, Boveri & Cie, of Baden, Switzerland, the Crocker-Wheeler Co. has secured their alternating current designs, patents and rights to manufacture in America, and have retained them as consulting engineers. The Crocker-Wheeler Co. is now putting on the market alternating current generators, transformers and accessories adapted to American practice. A contract has already been closed for a 200-k. w. 60-cycle 440-volt alternating current generator, for the Atlanta plant of the Procter & Gamble Co., of Cincinnati.

THE RUST WATER TUBE BOILER.

First introduced at the Minnequa Steel Works of the Colorado Fuel & Iron Co., at Pueblo, Col., the Rust water tube boiler was designed by the former chief engineer and general superintendent at that plant. The boiler proper consists of two upper or steam and water drums, two lower or mud drums and an auxiliary drum. Each upper drum is placed directly above a mud drum and is connected with the latter by a bank of straight vertical tubes. The auxiliary drum is placed above and between the mud drums, being connected to one of them by a row of short straight tubes or nipples, and to a series of small headers by a bank of straight vertical tubes. These headers are placed between the upper steam and water drums and are connected to them by short straight tubes or nipples.

The most novel and characteristic feature of the Rust boiler is the patent tube sheet which renders possible the combination of cylindrical drums and straight tubes without flat or stayed surfaces. This tube sheet is formed by heating the plate to the proper temperature, then pressing in a hydraulic press fitted with dies especially constructed for the purpose. The pressing is done in one operation. An important feature of this construction is that between each pressed up portion and those adjacent, there remains undisturbed cylindrical portions or belts of the original surface of the drum. This construction provides a drum in which bent tubes or flat stayed surfaces are unnecessary, and which at the same time is as strong and reliable as those in which it is necessary for the tubes to enter radially.

Each drum is fitted with this pressed tube sheet. The holes for the tubes in the large drums are so arranged that the tubes are staggered. The tubes of the inner rows are placed on a line between the tubes of the outside rows, thereby securing a more complete exposure of the hot gases, which in order to reach the chimney are forced to surround completely and to envelop the tubes. The spacing of these tubes is such as to leave room enough between the tubes of the outside rows to remove tubes of the inner rows, thus making it a simple operation to remove and replace any tube without disturbing any other tube or any of the brick work.

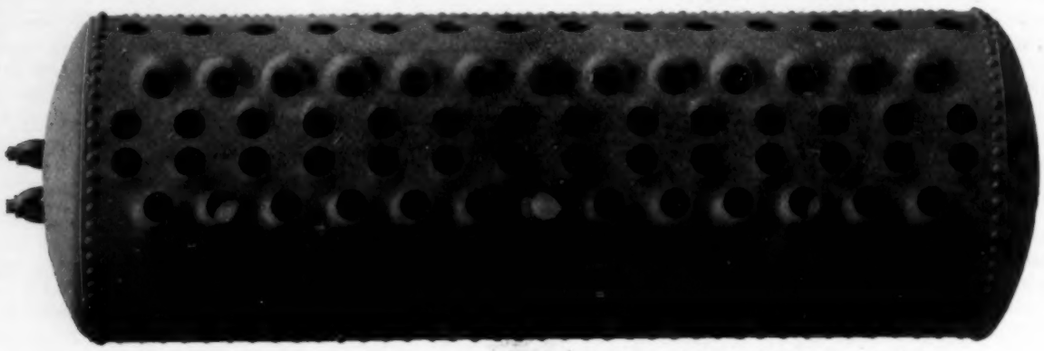


FIG. 1.—44-IN. DRUM FITTED WITH RUST PATENT TUBE SHEET.

By the introduction of the auxiliary drum and central bank of tubes the space between the main banks of tubes is so utilized as to secure a serviceable and convenient support for the baffle wall. The tiles forming the latter are placed between and are supported by the tubes of this bank, and owing to the consequent increased heating surface a boiler of larger capacity results without additional floor space, fittings or cost of setting. Each drum is provided with a manhole in one end to permit of access to the interior, and in the top of each header there is an oblong handhole by means of which the interior of the tubes of the central bank can be reached. The steam spaces of the upper drums are connected by cross pipes on top of which are outlets fitted with nickel seated safety valves. The steam outlet is placed on top of and at the center of the rear steam and water drum. The boiler is supported by four large cast iron saddles resting on masonry foundations, one saddle being placed under each

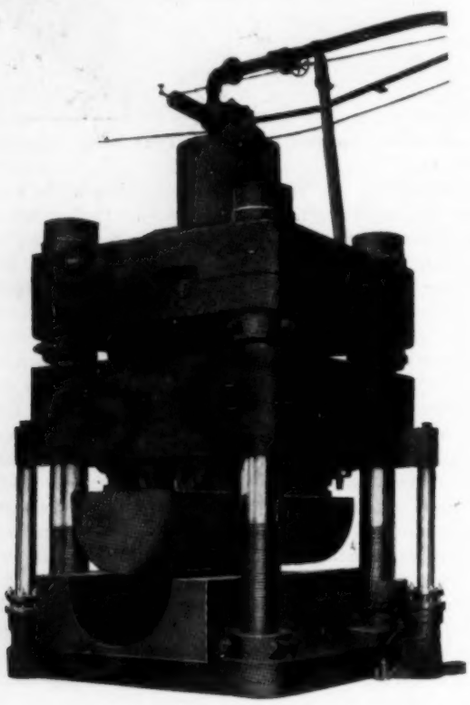


FIG. 2.—HYDRAULIC PRESS WITH SPECIAL DIES USED FOR PRESSING TUBE SHEETS.

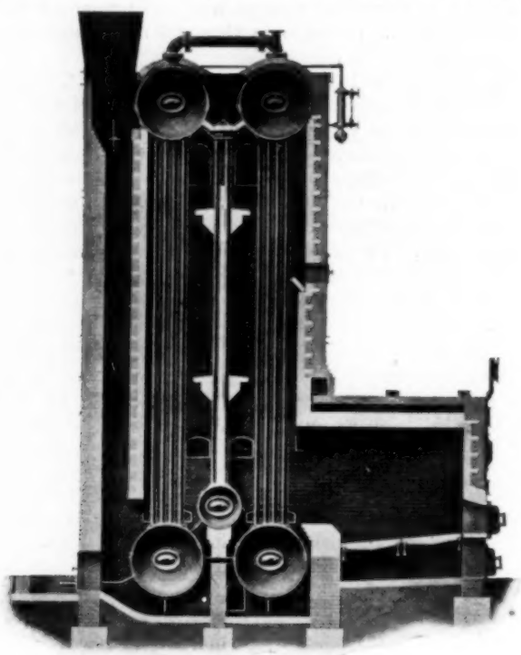


FIG. 3—SECTIONAL VIEW OF RUST BOILER WITH INDEPENDENT STACK CONNECTION.

end of each drum. The saddles under one of the drums are placed on rollers so as to permit of any slight movement that may occur due to expansion.

By referring to the accompanying sectional view of the boiler it will be seen that the top of the central baffle wall is far enough below the headers to leave sufficient space for the gases to pass from the front to the back bank of tubes. This view also shows horizontal baffles or bracket titles which project from the central baffle wall and serve to deflect the current of hot gases so as to force them toward and between the tubes of the main banks.

The furnace is of the exterior type, being of ample capacity, allowing proper admixture of air and fuel and complete combustion before the gases reach the cooling influence of the heating surfaces. The brick arch also retains sufficient heat to tend to preserve a uniform temperature in the furnace. This type of furnace permits the ready adjustment of grate area to suit any kind of fuel and the application of any style of grate bar or stoker. The ratio of heating surface to grate area is such as to give the best results under average conditions, but may be proportioned to suit any kind of fuel. The front is of cast iron and is so arranged as to permit the application of gas burners or any form of stoker.

The setting does not require any special shape of brick, is symmetrical and durable and is firmly bound together by buckstays, rods and angle binders at the corners. At the top of the setting and bolted to the corner binders is placed a

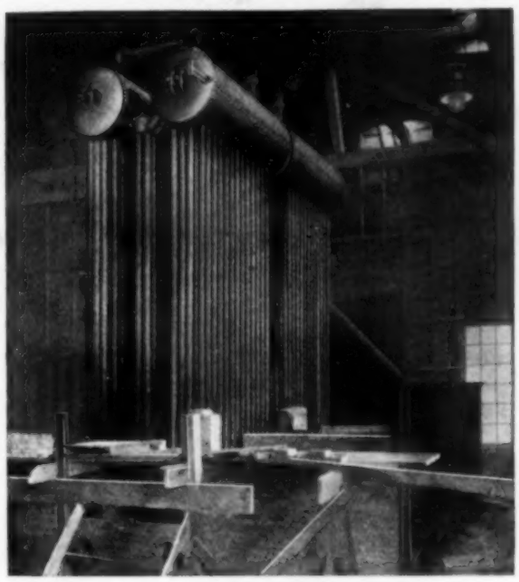


FIG. 4.—TWO RUST BOILERS IN COURSE OF ERECTION.

box-shaped frame made up of channels and plates, which furnishes a rigid support for the breeching and stack and also serves to bind firmly the brickwork at the top of the setting. On one side of the setting near the top are four small doors which permit access to the interior of the brickwork through which the tubes are passed in and out when replacements become necessary. Doors with small self-closing openings through which a hose may be inserted for blowing off the tube sheets are placed near the bottom of the setting. Other doors are furnished for securing access to the interior of the setting and for blowing deposits from the exterior of the tubes.

Over each stream and water drum and a little above is placed a light steel arch which serves as a center to support the brick arches over the drums during construction and makes an air tight covering for the setting. These arches are placed sufficiently above the drums to permit all possible upward expansion of the boiler without interfering with the brick covering. Between the arches are placed doors through which access is given to the headers. Other features of the setting are its ready adaptability to an underground flue connection without the use of any pipe or plate work and its adaptability for the use of waste gases from blast furnaces and heating or puddling furnaces.

The development of the patent tube sheet has enabled the manufacturers of the Rust boiler to embody in it important requisites of a successful steam generator. The straight and vertical tubes make cleaning and removal of scale easy, and mud and dirt settle readily to the mud drums. Flue dust cannot lodge on the heating surfaces and with tubes vertical and drums free all around, the dust settles in the pit below the drums. The long flue ways give prolonged contact between the hot gases and the heating surface, so that the maximum of heat is absorbed and chimney temperature is low. Baffle walls are securely held in place so that displacement with short circulating of hot gases is avoided. Since the bottoms of drums are not exposed to the action of the hottest flames, bagging or burning out of sheets is prevented. Freedom from corrosion is secured since the lower drums are not built up close with the brick work of the setting and space is left for free circulation of gases when the boiler is in operation and of air when the boiler is not in use.

The manufacturers are the Rust Boiler Co., of Pittsburg.

Basic vs. Acid Steel Rails.

Some controversy is going on in England upon the supposed inferiority of rails made from basic steel to those manufactured from Bessemer metal. A prominent firm, Cammell,

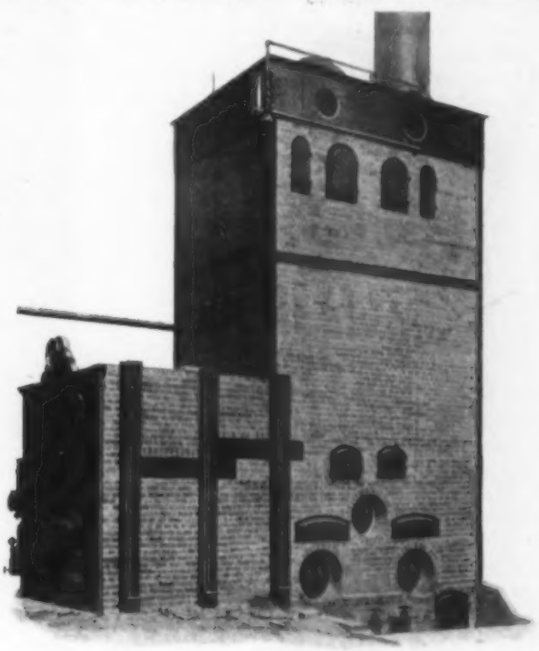


FIG. 5.—RUST BOILER ERECTED.

Laird & Co., some time ago issued a pamphlet in which they endeavored to show that breakages of rails have been much more frequent where basic steel rails are used. Their evidence, however, is not accepted by engineers, and it is pointed out that the use of basic steel for rails is almost universal in Germany, and that no inferiority has been found there, the rails being fully up to the standard. The dispute seems to be more a manufacturer's argument than anything else. In this country there will soon be an excellent opportunity for testing the relative merits of the different materials. The Tennessee Coal, Iron & Railroad Co. is turning out from its Ensley works a large quantity of rails made from basic open-hearth steel. These rails will be laid on the Louisville & Nashville and on the Southern railroad, where they will be used side by side with Bessemer steel. Any difference in the wear and strength of the rails will quickly be noted under the best conditions for a test.—[Engineering and Mining Journal.

The plant of the Erie Basin Ship Building Co., Buffalo, N. Y., has been sold to H. B. Root, of Hall & Root, vessel agents, that city, as a result of bankruptcy proceedings.

The West Virginia Malleable Iron Co. has recently purchased a style F Gates crusher from the Allis-Chalmers Co.

YALE & TOWNE ELECTRIC HOIST.

Where electric power is available, and where the service is frequent, with high economy in time an important element, the Yale & Towne hoist, of which side and end views are given below, forms one of the most notable recent responses to the demand for a simple and durable power hoist. It is made to withstand rough usage and to do its work when in the hands of an experienced workman. It may be readily moved from place to place, as with a chain hoist, and is available for use wherever in works or yard current is available. The field of the electric hoist is between that of the expensive traveling crane and the overworked hand hoist and it is one involving a very considerable range of service. It is built compactly and may be operated on small space.

Fig. 2 illustrates the construction and operation of the hoist. The controller handle, the controller and above the latter a solenoid hand brake are on the right. The hand brake acts on a pulley on one end of the armature spindle and the motor is enclosed in a case to the left. A small bevel pinion at the opposite end of the armature spindle drives the large enclosed gear shown in Fig. 1. The bevel gear shaft also carries a worm meshing wheel on the drum shaft. The ratio of the worm and worm wheel is such as to prevent the load from running down rapidly independent of the brake. The thrust on the worm shaft is taken by collars, which are part of the shaft, and accurately fitted to a bronze thrust bearing, the whole being immersed in oil. A glass gauge shown in both views indicates the height of the oil in the chamber. The motor is placed above the oil submerged parts of the hoist and the motor shaft bearings prevent the possibility of oil entering the motor. The improved oiling devices preclude heating from overload, or injury from the high temperatures usually existing near the ceiling. The load is taken on wire hoisting rope of tough steel, wound on grooved drums that are keyed direct to the main shaft. At the bottom hook the steel hoisting rope passes around an equalizing sheave, thereby balancing the strain. All parts under tension or subjected to transverse strain are of forged steel or wrought iron. The hoist always balances properly on its single upper hook whether loaded or empty, and pulls in a true vertical line throughout the lift. The single swivel hook suspension allows the hoist to pull as well at any angle. The working parts are enclosed in an oil tight iron casing, which excludes the dust and water, at the same time insuring thorough lubrication.

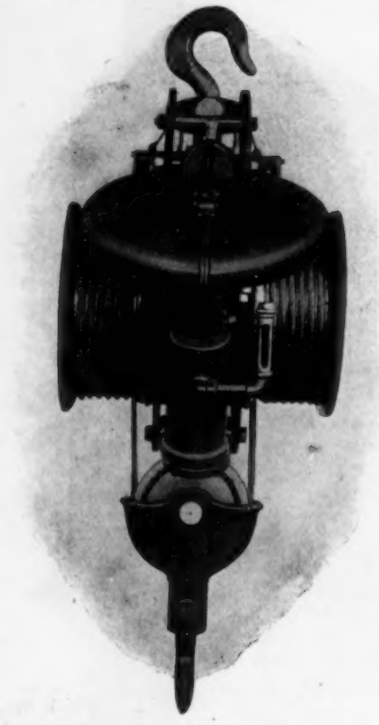


FIG. 1.—YALE & TOWNE ELECTRIC HOIST, END VIEW.

The load cannot run away even should the motor or brake become inoperative; an automatic cut-off prevents the load being hoisted too high. The hoist is operated from the floor, and is regularly equipped with a telescoping controller rod, enabling the workman to control it from a point in full view of his work without depending on signals of a crane operator. Pendant cords or chains are furnished if preferred, but the rod controlling device gives more accurate control of the load and is so made that it cannot catch on any obstruction and start the hoist when traversing on a crane or runway. These hoists are made in five standard sizes.

Chain Block Exhibit at St. Louis.

The electric hoist described above and as well the three kinds of Yale & Towne chain blocks—triplex, duplex and differential—are represented in the company's exhibit at St. Louis, of which a view is given herewith. The three forms of chain blocks are operated by electric motors for the purpose of showing the relative efficiency. Each block is supplied with a 1,000-lb. weight and so arranged that equal power is applied to each block. The result is that the triplex block lifts its load much more quickly than the others, while at the same time the ammeters show equal power applied to each block. The mechanism is automatic so that when the triplex weight arrives at the top all three blocks reverse their motion and lower the weights until all reach the floor, when they again automatically reverse and begin to hoist.

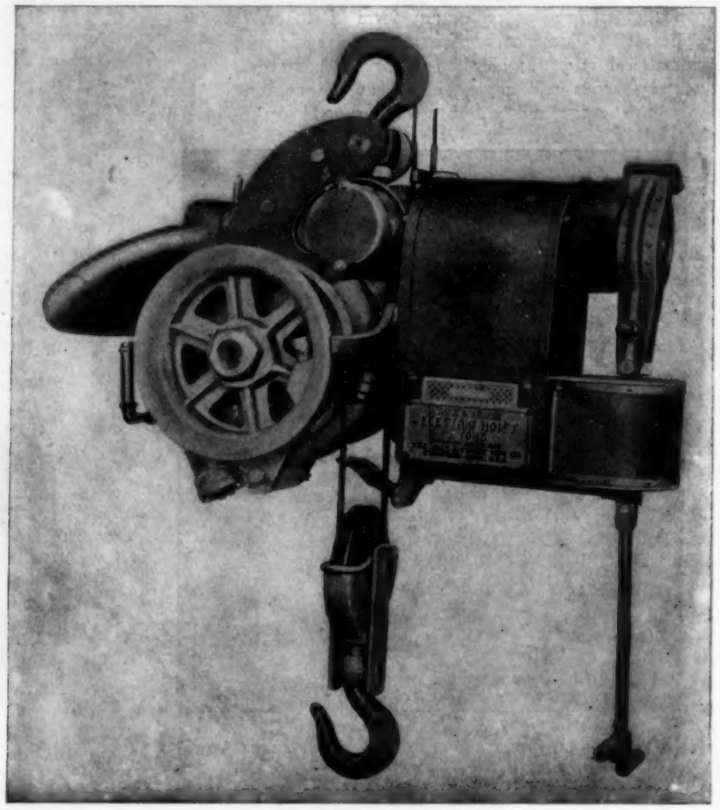


FIG. 2.—SIDE VIEW, TWO-TON HOIST.

Repairs to the rail mill of the Minnequa plant of the Colorado Fuel & Iron Co. were completed a few days ago, and the mill is now in operation. It has been announced at Pueblo, but not officially confirmed, that a new roughing engine is to be installed and new rollers added to the equipment. The Bessemer converter is now in operation. Furnace "D" will be in operation in a few days. "A" furnace is being overhauled and will be put in blast as soon as the improvements are completed. Previous to that time "E" furnace will be blown out for relining. The company has recently begun the experiment of employing Japanese laborers. About 50 Japs were put to work a few days ago.

LAKE SUPERIOR IRON MINES.

Diamond drilling has been under way on the famous "Section 30" 63-11, since February, 1903, first under the charge of D. E. Woodbridge, of Duluth, and, when his operations were abandoned, by G. N. Lonstorf, of Milwaukee. Part of the time four drills were at work and later there have been three, reduced now to two. The Lonstorf operations were commenced nearly a year ago. Since then not far from 6,000 feet of drilling has been done, part of it vertical and the rest at steep angles. Two diamond bits have been lost underground, and for the last one the operators have been fishing for five or six weeks. Two holes are now in progress. A number of shallow pits sunk by the former operators showed ledge, but a drill hole driven by them subsequently did not give any favorable results, though it went more than 1,000 feet. Ore has been cut in several of the holes put down, but on account of the difficulty of getting .nto it, little more is known as to the possibilities of a large deposit than when the former operations ceased last July.

FIG. 3.—YALE & TOWNE ELECTRIC HOIST HANDLING STRUCTURAL WORK.

Explorations by the White Iron Lake Iron Co. on the west side of the lake mentioned have been going on by diamond drill for some months and still continue. The company has developed a considerable body of magnetic ore, bunchy and silicious, and in many respects similar to the ore found on the Southall mine, in section 4 T 62 R 13. The company seems satisfied with the showings and claims it will continue work indefinitely, but the mining public generally is somewhat skeptical.

Mines at Ely, Minn., of the Oliver Iron Mining Co. are all working and are all sending out a large tonnage, both from underground and from the stock piles. Five shovels are in stock loading cars. A full force is employed at all the mines. B shaft, Pioneer mine, which has been under construction for the past four years, is about ready for operation, and the final details of equipment are being placed. A steel shaft house 160 feet high, is under construction by the American Bridge Co.

A daily average of about 26,000 tons of ore is coming to the head-of-the-lake docks of the Great Northern road. This requires 13 ore trains and a day and night shift for the crews.

The Duluth, Missabe & Northern road is hauling large trains, averaging from its Hibbing terminals 62 carloads of ore, or about 1,800 tons per train. The Duluth, Missabe & Northern road will this year make a larger proportionate hare of gross Minnesota shipments than ever before, on account of the exceedingly important developments that have been made in the Hibbing region and in T 58 R 20.

The tax valuation of Ishpeming mines for the present year is about $225,000 under a year ago, the decreases being in values of ore in stock on surface. The total assesment of the Cleveland Cliffs Iron Co., including ships and undeveloped lands, is $2,516,500; the Oliver Iron Mining Co., $1,868,875; the Pittsburg & Lake Angeline, $944,000; Ishpeming Mining Co., $19,000. The four mining companies pay more than 75 percent of the total tax of the city of Ishpeming.

Maas Brothers, of Negaunne, have put diamond drills at work at Crystal Falls, where they have considerable fee lands. They have been working at Iron River. One drill has been employed for some time and will be operated for an indefinite period testing their lands on that range.

Nothing has been determined as to stripping operations at the Grant mine of the Interstate Mining Co. Contracting firms have put in bids and it is quite probable that the work may be undertaken in time to mine from the open pit another year, or in 1906 The job will be a large one, as there is ore clear across a 40-acre tract, and at depths from 40 feet to greater.

Shenango mine, of the Shenango Furnace Co., has been preparing for mining operations for the past three years, and is now about ready to begin. It has been bothered successively by quicksands an dby water and the opening of the mine has been excessively expensive. It has already paid three years of royalty minimums, of $20,000 per annum, and it is hoped to get out nearly one year's minimum this season.

Lake Superior freights are weak, and the iron ore trade is more than ever the strengthening factor. Wheat is being carried from Duluth to Buffalo for 1 cent a bushel, or at the rate of 37 cents a gross ton. At this rate the line ships of the package freight fleets are anxious to get what there is to move, and none is left for big freighters. Ore charters at 70 cents a ton are reported frequently. The coal rate of 40 cents a ton to the head of Lake Superior is comparatively better than in

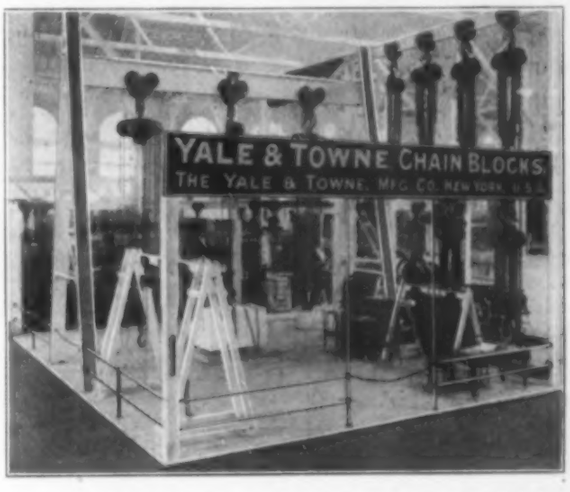


FIG. 4.—YALE & TOWNE CHAIN BLOCK EXHIBIT AT THE WORLD'S FAIR.

preceding years, and vessels are more inclined to pay attention to it and not to regard it as merely an incidental ballast cargo.

The strike of strippers and steam shovel helpers at Stevenson mine has been crushed by the superior weight of men anxious to work at any figure and the mine is working without interference. It is presumed that there will be sporadic strikes during the summer at this mine, and perhaps at others. The stockholders are to meet next week to decide whether to pay up or put the company in the hands of a receiver.

Tesora Mining Co. will strip about 100,000 yards more from its Forest mine, near Stevenson, during the summer. So far 65,000 yards have been stripped by the Wallace Contracting Co., which has the contract for the entire work. The mine is a small one, but contains excellent ore.

INTERNATIONAL STEAM PUMP CO.'S REPORT.

The annual report of the International Steam Pump Co. shows a falling off in manufacturing and trading profits as compared with the previous year of $258,671, and the balance after depreciation and interest on the funded debt decreased $470,412. The payment of dividends on the preferred and common stocks reduced the surplus for the year to $101,644, a decrease of $404,510. The total surplus of the company now stands at $2,284,993, a decrease of $1,567,686. The company reports for the year ended March 31 last: Total income, $1,936,738 in 1904 and $2,086,101 in 1903, a decrease of $176,627. The surplus was $2,284,993 at the close of the year against $3,852,679 on March 31, 1903. The consolidated balance sheet as of March 31 is as follows:

Assets.

	1904.	1903.	Increase.
Cost of property, good will, etc.	$24,983,471	$24,986,723	*$3,252
Discount on bonds	187,403	199,802	*12,399
Worthington Pump, London account	.....	925,361	*925,361
Materials and supplies	4,092,757	4,206,134	*113,377
Accts. and bills receivable	3,385,464	2,917,599	467,865
Miscellaneous debtors	147,831	201,717	*53,886
Associated Co. balances	30,613	13,472	17,141
Cash	184,631	595,469	*410,838
Total	$33,012,170	$34,046,277	*$1,034,107

Liabilities.

Capital stock	$27,655,350	$29,229,967	*$1,573,617
Surplus capital	1,116,399	.....	1,116,399
Res. from S. F.	64,384	.....	64,384
Notes payable and loans	649,375	.....	649,375
Trade accounts	635,131	604,705	30,426
Miscellaneous	205,461	149,962	55,499
Unpaid dividends	255,536	132,888	122,648
Reserve on contracts	145,541	176,076	69,365
Surplus	2,284,993	3,852,679	*1,567,686
Total	$33,012,170	$34,046,277	*$1,034,107

* Decrease.

President John W. Dunn in his report to the stockholders says: "The manufacturing plants of the company have been in continuous operation during the past year and have increased their production over the previous year by about $300,000. The orders taken during the year just closed amount to $9,500,000 and the unfilled orders on hand at the end of the fiscal year amount to over $4,500,000. The new Worthington disc meter has been successfully introduced and many valuable improvements have been made in the centrifugal and turbine pumps. The construction of the new works of Henry R. Worthington at Harrison is now far advanced and it is expected the foundries will be in operation in September, and that the entire plant will be available for manufacturing during the current year. These works have more than double the capacity of the present plants of Henry R. Worthington at Brooklyn and Elizabethport."

About 35 of the former employes of the Corliss & Nightingale and the Corliss Steam Engine Co., Providence, R. I., have formed a veteran association. The youngest man is 54, and the oldest 90 years old.

The American Bridge Co. has been awarded the contract for the steel superstructure of the Perry steel viaduct across the tracks of the Erie railway at Buffalo at $86,667.

THE BRAY SEMI-CONTINUOUS MILL.

The modern three-high plate mill, the looping and continuous rod mills, the continuous billet and sheet bar mills and the modern rail mill, with their enormous daily tonnages achieved with almost infinitesimal manual exertion, are all old stories. As they were developed by the pioneers the iron trade accepted them with nonchalance, seeing no cause for more than momentary congratulation. Their method of attack appeared so natural that their advent produced little surprise, while the ponderous machinery required and the large tonnage for which markets had to be found removed cause for the suggestion that they should have been developed earlier in the history of the steel industry.

Yet with all these lessons there has been little chafing at the continuance of methods for the rolling of sheets and black plates for tinning which are of the crudest and most laborious character. In ordinary rolling for tin plate purposes, if a 10-inch bar is employed, its thickness is reduced to about one-twenty-fourth the original thickness, and this requires four heatings, from two to five passes only being given after each heating. Citing an instance, in the production of black plate for 100-pound tin plate, the required gauge is between 30 and 31; the finished product of the hot mill is a pack af eight thicknesses, trimmed and sheared to two packs each 20 by 28 inches, weighing altogether 28 4-7 pounds, and for this purpose two bars, 20½ inches long, and with such a thickness as to make the weight of each about 16 pounds whether the width is 8, 10 or 12 inches, must be handled first singly and then as a pack, about sixty times, and the labor cost until the 18 percent reduction this year has been $12.37 per gross ton, or 16 cents for the double pack which is the product of these sixty-odd handlings. The bare labor cost of the reduction is more than double the total cost of converting a ton of pig iron into 4 x 4 billets, and much more than the total cost of reducing these billets to wire rods, while it is from 25 to 50 times as great as the labor cost of reducing slabs to quarter-inch plates on modern three-high plate mills.

It is therefore extremely gratifying to note that a practical innovation has at last been introduced. Since last fall the semi-continuous mill designed by C. W. Bray has been in successful operation at the Monongahela tin plate works, and contracts are now being let for a somewhat similar mill to be installed at Sharon for the rolling of sheets. Partly from circumstances wholly apart from the technical problem involved, and partly because the tin plate business involves a much narrower range of sizes and gauges, the first adaptation of the Bray idea was to a tin mill, but once successful it is believed the saving per ton will be greater on sheets than on tin plate.

The plant at the Monongahela works consists of a continuous heating furnace, five stands of roughing rolls with tables, an automatic matcher, two stands of finishing rolls and an automatic doubler. Two heated bars having been successively roughed are matched and the pair is then further reduced, being finally doubled into a pack of four. This work, done with one heating, is ordinarily accomplished with two heatings. The balance of the work is carried on under the old style, the packs of four being heated, rolled, doubled, heated and again rolled into a pack trimming into two packs of 20 x 28 inches. Thus substantially half of the former hand labor is dispensed with. In the case of sheets, the work is started with a somewhat heavier bar, and six roughing passes will be given, with two finishing, and the resultant material, having to be finished into heavier gauges, will receive but one heating and rolling by hand, so that roughly the Bray mill will in the case of sheets dispense with two-thirds the labor ordinarily accomplished by hand.

It might be supposed that the principal obstacles encountered in the somewhat protracted experimental stage which preceded commercial success lay in the rolling proper. This was not the case. It was a matter of no great difficulty to have the material enter the first and succeeding passes properly. Parenthetically it should be noted that the mill is fundamentally a tandem rather than a continuous mill in the strict sense. One chief difficulty was in the heating. In the ordinary process the furnace is but ill adapted to the awkward method of operation, which requires the withdrawal of heated material

intermittently with the insertion of material at no more than a black heat. The skill of the heater surmounts most of the difficulty, and what lack of regularity remains the roller takes care of. The automatic mill recognizes no such demands, and it therefore became necessary to heat the bars with a perfection and regularity never attained by hand work. As the finish required does not allow the steel to be brought to the ordinary scaling temperature the problem is difficult, since every part of the bar must be brought absolutely up to a limit, and that limit is a low one. Any irregularity would affect the reduction in different parts of the bar and prevent regular progress through the successive passes. The furnace had to be rebuilt several times before regularity and absence of scaling were attained. The automatic matcher, which simply places one piece evenly on another, also presented some difficulty, as did the doubler.

When the low temperature at which the work is done is mentioned, it will be seen how rapidly all the operations must be performed to permit of seven or eight passes being given before the steel is cold. It is well understood that even in the ordinary operation the steel loses more heat to the rolls than to the air, the greater conductivity of the former more than making up for the much shorter period of contact. As a consequence, the principal saving in heat loss, when double work is to be done with a heating, must be purely of that part of the heat loss which is the smaller. However, it is probable that a reduction has been effected also in the quantity of heat lost to the rolls. The problem here presented is an interesting one. The roll may be compared to a cistern with a constant level yet constantly receiving and losing water. The hotter the roll, the faster it loses heat and the less each piece loses to it. With each stand of rolls doing continually the same work it is possible to work with the rolls a little hotter than in the ordinary operation, where the work is more varied, and the heat contributed may come therefore from a greater number of pieces.

So far as we know, no manufacturer, other than the American Sheet & Tin Plate Co., which controls both the Monongahela and Sharon works, has done any experimenting of late along this exact line. Mr. Bray, the inventor, is chief mechanical engineer of the company. How far the ideas are protected by patents cannot be known until these have been issued. So far but one, and it is a very general one, has come out. Nothing has been heard for some time of the Norton mill, at Chicago, which aimed to eliminate largely hand labor by entirely different means. The Norton mill is a two-high reversing mill, and an ingenious system has been patented by which the tables and rolls are reversed and the screw turned by different amounts for successive passes.—[Iron and Steel Magazine.

The residence of Earl Walton, superintendent of the Brotherton and Sunday Lake mines at Wakefield, on the east end of the Gogebic range, was destroyed by dynamite July 11. Not less than twenty pounds of dynamite was used. A lighted fuse probably set off the explosive. No connecting wires could be found. Sections of the house and veranda were blown 200 feet, but the family, asleep up stairs, escaped serious injury. Supt. Walton has no idea as to the identity of the perpetrators or their motives. A strike occurred at the mines in January against 10 percent cut in wages. Some of the old employes found their places taken when the two mines resumed. As a result of the explosion Sheriff Olson has sworn in an extra force of deputies. The Brotherton and Sunday Lake mines are important iron ore producers, and are controlled by Joseph Sellwood, of Ishpeming, Mich.

The United Iron Works Co., Springfield, Mo., held the annual stockholders' meeting recently and re-elected the old officers. A four percent cash dividend was declared and an amount exceeding the dividend was placed to the credit of the surplus fund.

The Globe Iron Co., Jackson, O., has made extensive repairs to its Fulton furnace and has installed new blowing engines and other equipment. The stack, which has been idle since April 26, will be blown in Aug. 1.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Durable Steam Trap Co., of Youngstown, O., has been organized to manufacture the Morgan-Bletso trap. The company is capitalized at $20,000 and John G. Morgan, William Bletso, J. E. Jones, Louis Quinby and E. J. Anderson are the incorporators.

The Youngstown Foundry & Machine Co., which is a consolidation of the Youngstown Steel Casting Co. and the Youngstown Foundry & Machine Co., has been incorporated with $250,000 capital.

The Harrington Metal Lathe Co., of Youngstown, O., has been incorporated with $5,000 capital. A. V. White, W. A. Kingsley and John T. Harrington are the incorporators.

The Cienfuegos, Palmira & Cruces Railroad and Electric Power Co., which was organized last fall for the purpose of constructing and operating an extensive electric railway system in Southern Cuba and lighting a number of cities and villages in that part of the world, will this month award contracts for material, equipment, etc., representing an expenditure of upwards of $500,000. The company is composed of Cuban capital principally. Bruno Diaz, of Bruno Diaz & Co., Water street, New York, is president of the company. Cornelius C. Vermeule, 203 Broadway, is the consulting engineer. The company will, in the first instance, build an electric traction system in Cienfuegos, which is one of the most flourishing seaport towns in Cuba. The initial plant, for which contracts are about to be let, will have a capacity of upwards of 4,000 horse-power. Eventually additional equipment will be put in which will bring the development up to 10,000 horse-power. The first equipmen will consist of three generators—single phase—of 1,000 kilowatts capacity each direct connected to water turbines. Other contracts about to be closed will embrace 9,000 feet of 36-inch steel pipe and 12 passenger cars—42 feet long—equipped with four motors of 40 horse-power, or 160 horse-power for each car.

The George F. Moore Co., New York City, has been incorporated with a capital of $50,000, to manufacture moldings and machinery. Directors are: G. F. Moore, New York City; Henry Schroeder, Chicago, and C. J. Moore, Philadelphia.

Strube Machine Works, Chicago, have been incorporated with a capital of $50,000, to manufacture machinery. Incorporators are: J. B. Paine, Wilbur Bassett and Edith Edgren.

The Lakeside Foundry Co., Erie, Pa., has been incorporated with a capital of $50,000.

The John Zimmermann Co., New York City, has been incorporated with a capital of $300,000, to manufacture machinery. Directors are: John Zimmermann, L. F. Costelle and J. C. Zimmermann, of New York.

The Brown Excavating Machine Co., Brooklyn, N. Y., has been incorporated with a capital of $25,000. Directors are: W. E. Brown and I. W. Rinker, Brooklyn; W. H. Scheel, New York.

The L. H. Prentice Co., of New York, has been incorporated with a capital of $30,000 to manufacture machinery. Incorporators are: William W. Hubbard, A. L. Canfield, New York; L. H. Prentice, Chicago.

Articles of incorporation have been filed by Bryant & Lee, foundrymen, Minneapolis, with a capital stock of $50,000.

The Tuttle Mfg. Co. has been incorporated at Rochester, N. Y., capital $50,000, to manufacture Tuttle patent posthole augers and other patented articles. Directors: C. L. Tuttle and C. B. Ernst, Rochester; F. M. Higgins, Warsaw, N. Y.; H. G. Knowles and W. S. Knowles, of Providence, R. I.

The Frontier Wire Works have been incorporated at Buffalo, N. Y., with paid in capital of $4,000. Directors: Jno. C. Metherell, W. L. Albee and W. L. Albee Jr.

The Holub-Dusha-Paige Co. has been incorporated at Half Moon, N. Y. (near Troy), to manufacture machinery, capitalized at $36,000. The directors are: L. Holub, Paul Dusha, of New York City, and J. H. Paige, of Brooklyn.

Fires and Accidents:—

The Phillips & Rangeley railroad shops, at Phillips, Me., were destroyed by fire recently. Loss was about $10,000.

The shops of the Atchison, Topeka & Sante Fe railroad, at Cleburne, Tex., were burned July 2. Loss was about $300,000. The machinery destroyed was valued at $150,000.

The new brick building which is being erected at Bettendorf, Ia., by the Reliable Gas Machine Co., was razed to the ground by a storm which swept over that city July 3. The building was one story, 100 x 30 ft. It was nearly completed and machinery was to be installed in a few days.

The plant of the National Lock & Metal Co., Brooklyn, N. Y., was recently damaged by fire to the extent of $5,000.

New Construction:—

The Gleason Works, Rochester, N. Y., has purchased 20 acres adjacent to the yards of the New York Central & Hudson River railroad in that city. The purchase was made at the time because a particularly good opportunity was presented, but no building will be done this year. Next spring the company may erect a foundry building, but will not be ready to consider plans before Jan. 1. The transfer of the machine shop will be deferred until a still later date.

The Hansell & Elcock Co. will build a new foundry at Butler street and Archer avenue, Chicago, at a cost of $50,000.

G. Walter Greene, Petersborough, Ont., will rebuild his foundry and machine shop recently damaged by fire. Plans for the new building call for about one-half more room in the foundry than there was in the old plant. A temporary building has been erected and as the cupola was very little damaged castings are being made every day with a small force. Mr. Greene expects to have his new plant completed by September.

The Standard Machinery Co., Mystic, Conn., is beginning the erection of a new plant. A brick building for storage and other purposes will be erected where the machine shop now stands. The frame buildings will gradually be replaced by more modern fireproof structures.

The Delaware River Steel Casting Co., Chester, Pa., now has its plant in operation. The main foundry is 127 by 500 feet, equipped with the best modern machinery.

The Pacific Tube Works have been organized at Seattle, Wash., by H. K. Flagler, formerly of Pittsburg, James A. Moore, of Seattle, and others. Mr. Flagler states that a plant will be erected for the manufacture of lapwelded iron boiler tubes and lap and butt-welded iron and steel steam, gas and water pipes, and that the mill at the plant at the start will have a capacity of 50 tons per days. The plant will be located near the city of Seattle on Puget sound.

Newspaper reports from San Francisco state that extensive improvements and additions are to be made to the plant of the Pacific Steel & Wire Co., at Oakland, Cal. A director states that at a recent meeting plans for enlargement were discussed, but that the company is not prepared to give any information at present. Another meeting of the directors is to be held in the East in September, and it is expected that at the session it will be decided just what additions and improvements are to be made to the plant.

The contract has been let for the construction of the buildings to be erected by the Seattle Steel Co., Seattle, Wash. The buildings will cover 100,000 square feet of ground, and it is thought they will be finished within 90 days. The foundations have been completed for some time.

The Montpelier Foundry & Furnace Co., Montpelier, O., which recently increased its capital on account of the growth of its business, will erect a machine room of brick or concrete, and install a few heavy modern tools. Plans for equipment are not yet completed.

The International Acheson Graphite Co., Niagara Falls, N. Y., have commenced work on an addition to the plant which will double its capacity. The McClintic-Marshall Co., of Pittsburg, has the contract for the structural steel work for the new buildings. Besides the main addition, which will be 100 x 150 feet, a fine office building will be erected.

The Sternberg Mfg. Co., Davenport, Ia., manufacturer of cigar molds, etc., has made plans for the erection of three additional buildings, a machine shop, a wood working shop and a boiler house.

General Industrial Notes:—

The crusher erected by the Keystone Slag Co., at Reading, Pa., has been placed in operation. The plant occupies a corrugated iron building 90 ft. square and 80 ft. in height. The crusher will have a daily output of from 600 to 700 tons of slag, and operations will be carried on at the slag bank of the Keystone furnaces of the Reading Iron Co. Jacob V. R. Hunter is the general manager. The plant was erected under his supervision.

The Gadsden Pipe & Foundry Co., Gadsden, Ala., resumed work July 5 with nearly a full force in order to fill orders recently received.

The Sweet Steel Co. has announced that the Williamsport, Pa., plant will be in operation July 15 and that the plant at Syracuse, N. Y., will be closed Aug. 15. The buildings at Syracuse have not yet been sold.

The Adam Steel & Wire Works, Joliet, Ill., recently incorporated with a capital of $50,000, will conduct the business that has been carried on for the past 25 years by W. J. Adam. A specialty is made of structural steel for prison and jail construction.

The Valley Foundry & Machine Works Co., established at Fresno, Cal., five years ago in a small shop, has moved into its new building, 70 x 100 feet, two stories, which is equipped with the best modern machinery. The company has been very prosperous and apparently has a bright future before it.

All the Pennsylvania railroad employes who were laid off recently at the Altoona, Pa., shops have been put to work. An order to construct 500 refrigerator cars has furnished work for the men.

The new plant of the Eclipse Rolling Mill & Mfg. Co., Birmingham, Ala., has been placed in operation. The company manufactures bar iron in special shapes.

The Ricker Mfg. Co., Rochester, N. Y., recently incorporated, suceeds to the business of Wentworth G. Ricker, manufacturer of elevators, hand hoists, scales, etc. Mr. Ricker, although still vigorous and active, felt that he needed younger blood in the business, and in getting that thought it was best to incorporate.

No. 2 furnace of the South Sharon plant of the Carnegie Steel Co., South Sharon, Pa., will be blown in on Monday, July 18. Furnace No. 1 was blown out two weeks ago for relining and repairs. Furnace No. 2 was completed several days ago, but was not placed in operation owing to the curtailed demand for iron. With the other stack out it has been found necessary to operate this furnace in order to supply the demand for iron in that district. The rod and nail mills at this plant which are now idle are expected to resume on August 1.

James McNeil & Co., Pittsburg, have been awarded the contract for furnishing the steel rivited pipe for the new five foot intake, one mile in length, by the municipality of Erie, Pa.

Ten of the 20 tin mills of the South Sharon, Pa., tin plate plant of the American Sheet & Tin Plate Co., resumed operations this week. The remaining mills will be idle for some time.

The Bessemer plant of the Ashland Steel Co., Ashland, Ky., is idle and will probably remain inoperative the remainder of the month. The sheet mill at that place continues idle.

The Harbison-Walker Refractories Co., Pittsburg, last week reduced its quarterly preferred dividend from 1½ to 1 percent, payable this week. This places the stock on a 4 instead of a 6 percent basis.

The Iron Co., of America, at a meeting held at Scottdale, Pa., elected officers as follows: Aaron Loucks, president; L. H. Leitzell, secretary; D. S. Loucks, treasurer. The company has purchased an idle iron mill at Roanoke, Va., and is preparing to operate the same. Efforts are being made to begin operations on Sept. 1.

The plant of the Clearfield Steel & Iron Co., near Clearfield, Pa., was shut down last week on account of a strike of the workers.

The Kellogg-McCrum-Howell Co., of New York, was last week formed by a consolidation of the Kellogg-Richmond Co., of Norwich, Conn.; the Penn Enamel Ware Co., of Blairsville, Pa., and the Acme Radiator Co., of Uniontown, Pa. C. Kellogg is president; George D. Howell, vice president; and L. G. McCrum, treasurer.

The supereme court of the State of New York has issued an order making the sheriff of Monroe county, of that state, the custodian of stock and bonds of the National Car Wheel Co., of Pittsburg, to the par value of $500,000, pending the outcome of litigation brought against that corporation in Pittsburg.